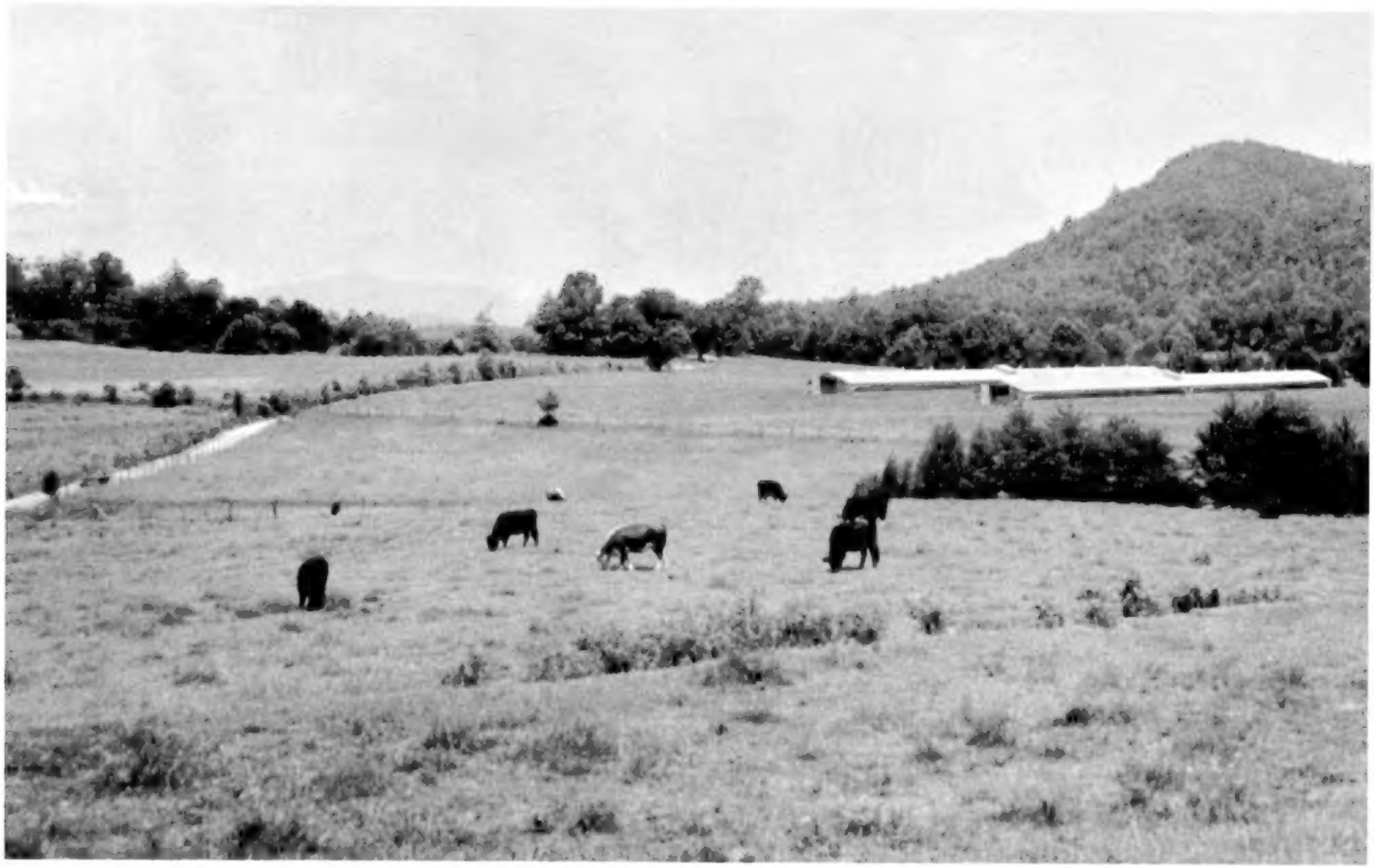
SOIL SURVEY OF

Dawson, Lumpkin, and White Counties, Georgia



U. S. DEPARTMENT OF AGRICULTURE
Soil Conservation Service and
Forest Service
In cooperation with
UNIVERSITY OF GEORGIA
College of Agriculture
Agricultural Experiment Stations

Issued April 1972

Major fieldwork for this soil survey was done in the period 1960-65. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in this publication refer to conditions in the county in 1966. This survey was made by the Soil Conservation Service and the Forest Service in cooperation with the University of Georgia, College of Agriculture, Agricultural Experiment Stations, as part of the technical assistance furnished to the Upper Chattahoochee River Soil Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY of Dawson, Lumpkin, and White Counties contains information that can be applied in managing farms and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in determining the suitability of tracts of land for agriculture, industry, and recreation.

Locating Soils

All the soils of Dawson, Lumpkin, and White Counties are shown on the detailed map at the back of this publication. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information. This guide lists all the soils of the counties in alphabetic order by map symbol and gives the capability classification of each. It also shows the page where each soil is described and the page for the woodland group and wildlife group in which the soil has been placed.

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils in the soil descriptions and in the discussions of the capability units and woodland groups.

Foresters and others can refer to the section "Use of the Soils for Woodland." In this section the soils are grouped together according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Use of the Soils for Wildlife."

Engineers and builders can find, under "Use of the Soils for Engineering," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Community planners and others concerned with town and country planning can read about soil properties that affect the choice of sites for homes, nonindustrial buildings, schools, and recreation areas in the section "Town and Country Planning."

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Dawson, Lumpkin, and White Counties may be especially interested in the section "General Soil Map" where broad patterns of soils are described. They may also be interested in the information about the counties given at the beginning of the publication and in the section "Additional Facts About Dawson, Lumpkin, and White Counties."

Cover picture: Masada fine sandy loam, 6 to 10 percent slopes, eroded used for pasture of Kentucky 31 fescue. Raising cattle and producing chickens are major enterprises on many farms in this area. Lynch Mountain is in the upper right background.

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SOIL SURVEY OF DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA
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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE, AGRICULTURAL EXPERIMENT STATIONS

DAWSON, LUMPKIN, AND WHITE COUNTIES occupy approximately 475,520 acres, or 743 square miles, in the northeastern part of Georgia (fig. 1).

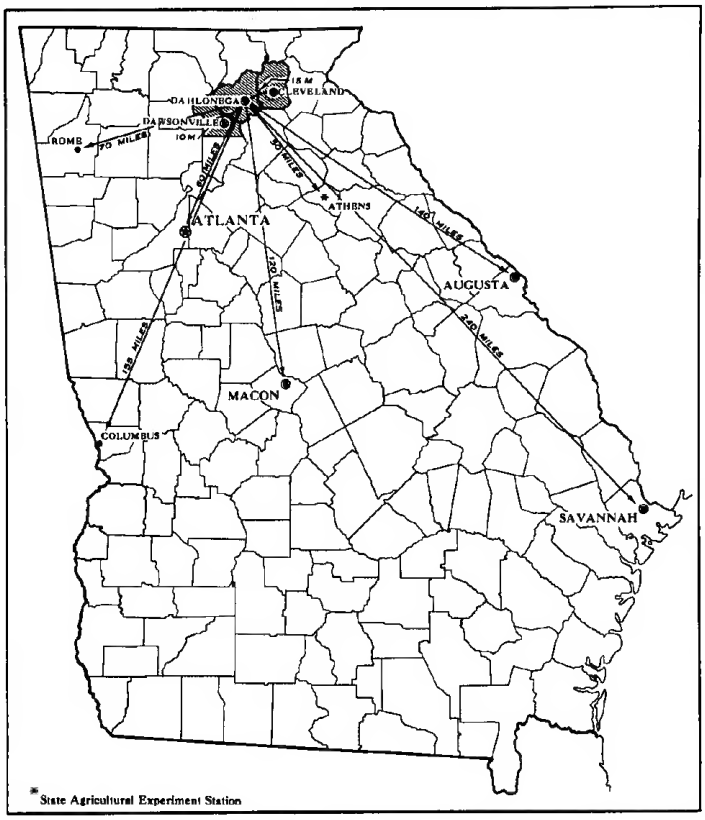

Figure 1.--Location of Dawson, Lumpkin, and White Counties in Georgia.

Dawsonville, the county seat of Dawson County, is near the southeastern part of the county. Dahlonega, the county seat of Lumpkin County, is near the center of the county. Cleveland, the county seat of White County, is in the south-central part of the county.

The southern two-thirds of the survey area occupies rolling to steep uplands within the geographic area known as the Upper Piedmont Plateau. The northern third of the area, located in the Appalachian Mountains, is generally moderately steep to very steep. Because the survey area is rolling to steep, streams are generally small and rapid. Most of the soils are well drained to excessively drained. The soils having more gentle slopes and those on flood plains are generally suited to a wide range of crops. The three counties have been primarily agricultural since early settlement.

A large part of the survey area is covered by a mixed stand of hardwoods and pine. The U.S. Forest Service, and pulp and paper companies, hold much of the acreage in large tracts that they manage and protect. Wood products, poultry, and livestock are among the chief sources of income in the survey area. Gold was mined extensively in Lumpkin County until around 1847, and there were intermittent operations until around 1900. Some gold mining was done in Dawson and White Counties during that period. The survey area has a comfortable humid climate and almost unlimited water resources. The raising of poultry and livestock has been the main source of income in this survey area since 1940. Corn is the main row crop. Vegetables are grown mainly for home use, but a few farmers produce small quantities for markets. The acreage used for row crops decreased significantly from 1940 to 1950, and the acreage in forest and pasture increased.

For more information see the sections "Climate" and "Physiography, Drainage, and Water Supply."

HOW THIS SURVEY WAS MADE

Soil scientists made this survey to learn what kinds of soil are in Dawson, Lumpkin, and White Counties, where they are located, and how they can be used. The soil scientists went into the counties knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes, the size and speed of streams, the kinds of native plants or crops, the kinds of rock, and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The soil series and the soil phase are the categories of soil classification most used in a local survey (10) 1/.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Fannin and Cartecay, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Fannin fine sandy loam, 2 to 6 percent slopes, is one of several phases within the Fannin series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map in the back of this publication was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Dawson, Lumpkin and White Counties; soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the name or names of the dominant soils. If the complex is made up of soils from two or more series, the names are joined by a hyphen. An example of a complex in this survey area is the Cartecay complex.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. The name of an undifferentiated group consists of the names of the dominant soils, joined by "and." Ashe and Edneyville stony loams, 10 to 25 percent slopes, is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Gullied land is a land type in this survey area.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. Then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

1/ Italic numbers in parentheses refer to Literature Cited, p. 102.

GENERAL SOIL MAP

The general soil map at the back of this soil survey shows, in color, the soil associations in Dawson, Lumpkin, and White Counties. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one to three major soils and at least one minor soil. It is named for the major soils. The soils in one association may occur in another, but in a different pattern.

Although soils in an association may vary in properties, an association ordinarily has common characteristics that set it apart from another. Some of these characteristics are (a) topographic features, such as broad, smooth slopes or steep, rough relief, (b) depth to rock, (c) flood hazard, (d) similarity of wetness, or (e) texture and depth of the major soils. These characteristics are important in determining how land can be used safely and economically. Taking them into account is basic to modern practices of farming and to resource planning and development.

A map showing soil associations is useful to people who want a general idea of the soils in an area, who want to compare different parts of an area, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management. The general soil map complements the detailed soil map.

Soil associations and delineations on the general soil map in this soil survey do not always agree or join fully with general soil maps of the adjacent counties published at an earlier date. Differences are brought about by better knowledge about soils and modifications and refinements in soil series concepts. In addition, the uses of the general soil map have expanded in recent years; thus, a more precise and detailed map is required to accommodate the needed interpretations. Still another difference is caused by the range in slope permitted within an association.

The seven soil associations in these counties are described in the following pages.

1. Cartecay-Toccoa-Congaree Association

Deep, somewhat poorly drained to well-drained soils of the flood plains

This association consists of nearly level to very gently sloping soils that formed in recent alluvium and are subject to flooding. Stream channels are well defined and have cut to bedrock in many places. Areas of this association are widely scattered and are discontinuous in places along most streams. This association makes up about 5 percent of the survey area (pl. I, top).

The dominant soils are the Cartecay soils, which make up about 30 percent of the total acreage; the Toccoa soils, about 25 percent; and the Congaree soils, about 10 percent. Minor soils make up the rest.

The Cartecay soils have a mainly brown loam to loamy sand surface layer 4 to 8 inches thick. Below this are somewhat poorly drained, mottled, and stratified layers of chiefly reddish-yellow, pale-brown, and light brownish-gray loam, fine sandy loam, loamy sand, or gravelly loamy sand. Cartecay soils occur mainly on narrow flood plains along slow to moderately rapid streams.

Toccoa soils have a dark-brown to reddish-brown fine sandy loam to loamy sand surface layer 4 to 7 inches thick. This layer is underlain by moderately well drained to well drained, stratified layers of dark-brown, yellowish-brown, and gray sandy loam, fine sandy loam, gravelly sandy loam, and loamy sand. Toccoa soils occur on narrow to moderately wide flood plains along moderately rapid to rapid streams.

Congaree soils have a dark grayish-brown to dark-brown silt loam to fine sandy loam surface layer 8 to 12 inches thick. This layer is underlain by 25 to 36 inches of mottle-free, dark-brown to very dark grayish-brown loam, silt loam, and fine sandy loam. These soils generally occur on wide to moderately wide flood plains along streams.

Minor soils of this association are the excessively drained Buncombe soils and the poorly drained Wehadkee soils on flood plains, and the well-drained Masada and Starr soils and the somewhat poorly drained Augusta soils on terraces. These minor soils make up about 35 percent of the association.

Most of the well drained and moderately well drained soils can be used for commonly grown cultivated crops and pasture without the use of artificial drainage (pl. I, bottom). Only a small acreage is too wet for cultivated crops.

After adequate drainage is installed, most of the somewhat poorly drained and poorly drained soils in this association produce good to excellent pasture. The wooded areas support mixed stands of water-tolerant hardwoods.

Generally, the soils of this association have severe limitations for residential and industrial development. Limitations are moderate to severe if the soils are used for intensive recreation areas, such as play areas and campsites.

2. Hayesville-Fannin-Wickham Association

Moderately deep to deep, well-drained, very gently sloping and gently sloping soils on moderately wide ridgetops and on hillsides

This association consists of very gently sloping and gently sloping soils that occur on moderately wide ridgetops, on hillsides, and on toe slopes. The

slopes range from 2 to 10 percent and are dissected by drainageways (pl. II, bottom). Several areas of the association are scattered throughout the southern two-thirds of the survey area. The association makes up about 10 percent of the survey area.

The dominant soils in this association are the Hayesville soils, which make up about 48 percent of the total acreage; the Fannin soils, about 20 percent; and the Wickham soils, about 5 percent. Minor soils account for the remaining percentage.

Except in eroded areas, the Hayesville soils have a mainly strong-brown to dark grayish-brown sandy loam surface layer 4 to 10 inches thick. The eroded areas have a yellowish-brown to dark reddish-brown surface layer. The subsoil is chiefly yellowish-red and red clay loam to clay and extends to a depth of about 31 inches. Hayesville soils occur on moderately wide ridgetops and on broken, irregular, gently sloping hillsides.

Fannin soils have a mainly dark grayish-brown to dark reddish-brown fine sandy loam surface layer about 4 to 10 inches thick. This is underlain by 24 to 36 inches of yellowish-red to red sandy clay loam, clay loam, and silty clay loam in which the mica content is high and increases with depth. Fannin soils occur on narrow to moderately wide ridgetops and on broken, irregular, gently sloping hillsides.

Wickham soils have mainly a dark yellowish-brown to dark-brown fine sandy loam surface layer 5 to 10 inches thick. This surface layer is underlain chiefly by a yellowish-red or red sandy clay loam subsoil, which ranges in thickness from about 36 to more than 70 inches.

Minor soils are the Appling, Starr, Augusta, Cartecay, and Toccoa soils. These minor soils make up about 27 percent of the association.

Most of the soils in this association are slightly eroded to eroded. A small acreage is severely eroded, and here some of the subsoil has been mixed into the surface layer. The major soils are stable even when wet. Their internal drainage is good. The soils are easily worked, except in the severely eroded spots, which are difficult to work.

About two-thirds of the acreage in this association is in cultivated crops and pasture; the rest is wooded or idle. The soils are suited to all of the commonly grown crops, pasture, and pine trees. The farms in this area range from 60 to 200 acres in size. Keeping poultry and raising livestock are the main farm enterprises, and only a small acreage is in cultivated crops. Many of the formerly cropped areas have been reforested, chiefly to Virginia and shortleaf pines.

Generally, the soils of this association are suited to use for dwellings, industrial buildings, highways, and such recreational developments as campsites, intensive play areas, and golf fairways. These uses are moderately to severely limited in the steeper areas.

3. Hayesville-Rabun-Hiwassee Association

Moderately deep to deep, well-drained, very gently sloping and gently sloping soils on broken ridgetops and irregular hillsides

This association occurs on irregular hillsides and on narrow to moderately wide ridgetops. Slopes range from 2 to 10 percent and are dissected by many drainageways. Several areas of this association occur mainly in the central part of Lumpkin County, and many other areas are scattered throughout the southern two-thirds of the survey area. The association makes up about 4 percent of the survey area.

The dominant soils are the Hayesville soils, which make up about 30 percent of the total acreage; the Rabun soils, about 20 percent; and the Hiwassee soils, about 15 percent. The remaining acreage is occupied by minor soils.

Hayesville soils have a strong-brown, grayish-brown, or dark reddish-brown sandy loam or sandy clay loam surface layer about 4 to 10 inches thick. This is underlain by a yellowish-red to red clay loam to clay subsoil 18 to 30 inches thick. Hayesville soils occur on moderately wide ridgetops and on broken, irregular, gently sloping hillsides.

Except in eroded areas, Rabun soils have a dark reddish-brown or reddish-brown loam surface layer about 4 to 8 inches thick. Eroded areas have a clay loam surface layer. The surface layer is underlain by a subsoil consisting of 18 to 34 inches of dark-red clay loam to clay. Rabun soils occur on broken, irregular, narrow to moderately wide ridgetops and on irregular hillsides.

Hiwassee soils have a mainly dark reddish-brown loam surface layer about 2 to 10 inches thick. This is underlain by a subsoil chiefly of dark-red and red clay loam to clay 48 to 60 inches thick. Generally, Hiwassee soils occur in small to medium-sized, irregular, fan-shaped areas.

Minor soils are the Musella, Fannin, Tallapoosa, and Masada soils. These minor soils make up about 35 percent of the association.

Slightly more than half of this soil association is slightly eroded. About 40 percent is moderately eroded to severely eroded. In some places most of the original surface layer is gone and the remaining surface soil has been mixed with some of the subsoil through tillage. Where the plow layer is clayey, it is sticky when wet and hard when dry. Most of the acreage is in cultivated crops and pasture; the rest is wooded or idle. The soils of this association are suited to all of the commonly grown crops, pasture, and pine trees. Many of the previously cropped areas have been reforested, chiefly to Virginia and shortleaf pines.

The farms in this association are of average size for this survey area and are mostly farmer owned and operated. Poultry and livestock farms are dominant. Only a small acreage is in cultivated crops.

The major soils are fairly stable, even when wet, and therefore are considered suitable as sites for house foundations. Internal drainage is good. Except in the severely eroded areas, these soils are suitable for foot travel shortly after rains. Most of the soils in this association are suited to use for dwellings, industrial buildings, highways, and recreation areas such as campsites, intensive play areas, and fairways. The steeper areas have moderate to severe limitations for these uses.

4. Hayesville-Fannin-Edneyville Association

Moderately deep to deep, well-drained, sloping to steep soils on broken ridgetops and irregular hillsides

This association occupies narrow, broken ridgetops, where slopes are 10 to 15 percent, and hillsides where slopes range from 10 to 60 percent. These areas are dissected by many drainageways that generally occur in a dendritic pattern. This association is the largest in the survey area and occupies about 30 percent of the total acreage.

The dominant soils are the Hayesville soils, which make up about 40 percent of the association; the Fannin soils, about 20 percent; and the Edneyville soils, about 7 percent. The remaining percentage consists of minor soils.

The Hayesville soils have a strong-brown, grayish-brown, or dark reddish-brown sandy loam or sandy clay loam surface layer 3 to 10 inches thick. The subsoil is chiefly red clay loam about 16 to 42 inches thick. Hayesville soils lie on narrow, broken ridgetops and on steep to very steep, broken, and irregular hillsides.

The Fannin soils have a dark-brown to dark grayish-brown fine sandy loam and loam surface layer 3 to 10 inches thick. This layer is underlain by a subsoil of yellowish-red to red sandy clay loam, clay loam, and silty clay loam 18 to 30 inches thick. The mica content of this layer increases with depth. The Fannin soils occur on narrow, moderately long ridgetops and on broken, sloping to very steep hillsides.

The Edneyville soils have an olive-brown loam surface layer 7 to 12 inches thick. The subsoil is 11 to 30 inches of yellowish-brown and strong-brown loam and clay loam. The Edneyville soils occur on irregular, narrow, broken ridgetops and on short, broken, steep to very steep hillsides.

Minor soils are the Rabun, Tallapoosa, Musella, Ashe, Porters, and Tusquitee soils. These minor soils make up about 33 percent of the association.

Most of this association is not eroded or is only slightly eroded. However, a small acreage is eroded, and severely eroded spots occur in a few places. Here, tillage has mixed part of the subsoil into the surface layer.

Only a small acreage is in cultivated crops and pasture; the rest is wooded or idle. The steep soils in the association are difficult to work because of their slope. The less sloping soils are suited to commonly grown hay and pasture crops, which respond well to fertilizer and good management. All of the acreage is suited to pine trees and commonly grown hardwoods. Many of the previously cropped areas in this association have been reforested, chiefly to Virginia and shortleaf pines. A large part of this association is in Federal ownership as part of the Chattahoochee National Forest or is held by private timber companies.

The major soils are fairly stable even when wet. Therefore, most of the ridgetops have areas that are suitable as sites for house foundations. Internal drainage is good. These soils are suitable for foot travel shortly after rains. Because of slope, only small areas of these soils, chiefly on ridgetops, are suited to dwellings, industrial buildings, highways, and recreation areas such as campsites and intensive play areas. The steeper areas have severe limitations.

5. Tallapoosa-Musella Association

Chiefly moderately deep, well-drained to excessively drained, gently sloping to steep, cobbly soils on irregular ridgetops, foothills, and low mountains

This association is on irregular, narrow ridgetops that are dissected by numerous drainageways in a dendritic pattern. The slopes generally range from 6 to 12 percent, but some hillsides are as steep as 70 percent. The association occupies several areas that are scattered throughout the survey area and make up about 22 percent of it.

The dominant soils in this association are the cobbly Tallapoosa soils, which make up about 60 percent of the total acreage, and the cobbly Musella soils, which make up about 22 percent.

The Tallapoosa soils have a dark-brown to very dark grayish-brown cobbly fine sandy loam or loam surface layer about 4 to 12 inches thick. Below this is the subsoil, about 10 to 20 inches of yellowish-red to red sandy clay loam. The mica content of the subsoil generally increases with depth. The thicker surface layer and thinner subsoil normally occur near rock outcrops. Tallapoosa soils are on narrow, irregular ridgetops and on broken, sloping to steep hillsides.

The Musella soils have a dark reddish-brown cobbly to gravelly clay loam or loam surface layer about 2 to 7 inches thick. This is underlain by a dark-red gravelly clay loam to clay subsoil 10 to 20 inches thick. These soils occur on ridgetops and on steep hillsides.

Minor soils are the Fannin, Hayesville, Rabun, Hiwassee, and Chandler soils. These minor soils make up about 18 percent of the association.

On most of the soils in this association, there has been little or no erosion, but a small acreage is eroded. The soils are difficult to work because they are cobbly, shallow, or steep. Only small areas are in cultivated crops or pasture; the rest of the association is wooded or idle. Most of the previously cropped and pastured areas have been reforested, chiefly to Virginia and shortleaf pines.

The farms in this association are about average in size for the survey area. Poultry and livestock farms are the chief types of farms, and only small areas are used for cultivated crops or pasture. Most of the farms are farmer owned and operated. Only a few are operated by tenants. A large part of this association is in forest administered by the U.S. Forest Service or is in large private holdings.

The major soils on the ridgetops are moderately well suited to use for dwellings, highways, and recreation areas, such as campsites and intensive play areas. The steeper areas have severe limitations.

6. Edneyville-Porters-Ashe Association

Chiefly moderately deep, well-drained to excessively drained, sloping to steep soils on mountains

This association lies on irregular, rounded mountain crests and ridgetops that are dissected by numerous drainageways having a somewhat dendritic pattern. The slopes generally range from 10 to 15 percent, but a few mountain areas and hillsides have slopes of 10 to 70 percent. Generally, the several areas of this association are in the mountains and higher ridges that extend across the northern one-fourth of the survey area in a northeasterly direction. The association makes up about 19 percent of the three counties.

The dominant soils in the association are the Edneyville soils, which make up about 30 percent of the total acreage; the Porters soils, about 22 percent and the Ashe soils, about 17 percent. The rest is made up of minor soils.

Edneyville soils have mainly an olive-brown loam to fine sandy loam surface layer about 4 to 11 inches thick. This layer is underlain by a subsoil of yellowish-brown and strong-brown loam and clay loam about 18 to 36 inches thick. In places the subsoil contains rock fragments in the lower part. Many areas have rock on the surface. The Edneyville soils are intermingled with Ashe and Porters soils.

Porters soils have a mainly very dark grayish-brown loam surface layer 4 to 8 inches thick. This layer is underlain by a dark-brown loam and clay loam subsoil that is 15 to 25 inches thick and contains rock fragments in the lower part. Porters soils occur on broken and narrow mountain crests.

Ashe soils have a very dark gray fine sandy loam to loam surface layer about 2 to 16 inches thick. The subsoil is 10 to 21 inches of dark-brown to dark yellowish-brown sandy loam to loam that generally contains few to common rock fragments and mica flakes. The Ashe soils occupy rounded, irregular ridgetops and broken, strongly sloping to very steep hillsides that contain few to many rock outcrops.

Minor soils are the Tusquitee and Burton soils. These minor soils make up about 31 percent of the acreage.

Most of the soils in this association are uneroded or only slightly eroded. However, the steeper mountain sides contain few to many rock outcrops and escarpments. The soils are difficult to work because they have a thin root zone and commonly are steep. Only a small acreage has been cultivated or pastured; most of the rest remains in woods. These soils are suited to commonly grown hardwoods and white pine trees. Previously cultivated areas have been reforested, chiefly to hardwoods and white pine. A large part of the association is in forest administered by the U.S. Forest Service. Only small tracts are privately owned.

Only small, isolated areas on the lesser slopes are suitable sites for house foundations. The steeper areas have severe limitations for such uses as highways and recreation areas.

7. Rabun-Hayesville-Hiwassee Association

Moderately deep to deep, well-drained, sloping to steep soils on narrow, irregular ridgetops and broken hillsides

This association is on irregular, narrow ridgetops, hillsides, and colluvial areas. The slopes generally range from 10 to 15 percent on the ridgetops and from 15 to 70 percent on the hillsides and in colluvial areas. They are dissected by many drainageways. The major areas of this association are mainly in the central part of Lumpkin County. Other areas are scattered throughout the southern three-fourths of the survey area. This association makes up about 10 percent of the total acreage in the three counties.

The dominant soils are sloping to very steep. They are the Rabun soils, which make up about 40 percent of the total acreage; the Hayesville soils, about 30 percent; and the Hiwassee soils, about 15 percent. Minor soils account for the rest.

The Rabun soils have a mainly dark reddish-brown to reddish-brown loam to clay loam surface layer 4 to 8 inches thick. Below this is the dark-red clay loam to clay subsoil that extends to a depth of 38 inches. The Rabun soils occur on narrow, broken, irregular ridgetops and on short, irregular hillsides.

The Hayesville soils have a mainly strong-brown to dark reddish-brown sandy loam surface layer 3 to 10 inches thick. This is underlain by a subsoil of yellowish-red to red clay loam and sandy clay loam 18 to 30 inches thick. Hayesville soils occupy narrow to moderately wide ridgetops and broken hillsides.

The Hiwassee soils have a dark reddish-brown loam or fine sandy loam surface layer 3 to 8 inches thick. Underlying this layer is the subsoil consisting mainly of dark-red clay loam to clay 40 to 60 inches thick. Hiwassee soils generally occur in small to medium-sized colluvial areas.

Minor soils are the Wickham, Musella, Fannin, and Tallapoosa soils. These minor soils make up about 15 percent of the association.

Most of the acreage in this association is slightly eroded to eroded. However, about 15 percent of it is severely eroded. In some places most of the

original surface soil has been removed, and the remaining part of this layer is mixed with material from the subsoil.

A small percentage of the total acreage is in cultivated crops or pasture; the rest is wooded or idle. Only the soils on the lesser slopes are suited to hay and pasture crops. However, all soils in the association are suited to pine trees and commonly grown hardwoods. Most of the previously cropped areas have been reforested, chiefly to Virginia and shortleaf pines.

The farms of this association are of average size for this survey area and are mostly farmer owned and operated. Poultry and livestock farms are the chief farm operations. Only small patches on the lesser slopes are in cultivated crops.

Nearly all of these soils have severe limitations for nonfarm uses.

DESCRIPTIONS OF THE SOILS

This section describes the soil series and mapping units in Dawson, Lumpkin, and White Counties. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

The procedure in this section is first to describe the soil series and then the mapping units in the series. Thus, to get full information on any one mapping unit, it is necessary to read the description of the unit and also the description of the soil series to which it belongs. As mentioned in the section "How This Survey Was Made," not all mapping units are in a soil series. For example, Gullied land is a miscellaneous land type and does not belong to a soil series; nevertheless, it and the other land types in the counties are listed in alphabetic order along with the series.

An essential part of each soil series is a description of the soil profile, the sequence of layers beginning at the surface and continuing downward to depths beyond which roots of most plants penetrate. Each soil series contains both a brief nontechnical and a detailed technical description of the soil profile. The nontechnical description will be useful to most readers. The detailed technical description is included for soil scientists, engineers, and others who need to make thorough and precise studies of soils.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. At the end of the description of each mapping unit are listed the capability unit, the woodland group, and the wildlife group in which the mapping unit has been placed. The page where each of these groups is described can be found readily by referring to the "Guide to Mapping Units."

For more general information about the soils, the reader can refer to the section "General Soil Map," in which the broad patterns of soils are described. Many of the terms used in the soil descriptions and other parts of this survey are defined in the Glossary and the "Soil Survey Manual" (9).

The names, descriptions, and delineations of soils in this published soil survey do not always agree or join fully with soil maps of the adjacent counties published at an earlier date. Differences are brought about through better knowledge about soils or through modifications and refinements in the concepts of soil series. In addition, the correlation of a recognized soil is based on the acreage of that soil and its dissimilarity to adjacent soils within the survey area. Commonly, if a soil occupies only a small acreage, and if its management and response are much the same as those of similar soils, it is more feasible to include the soil with the similar soils rather than to set it apart as a different soil. The soil descriptions reflect these combinations. Other differences are brought about by the predominance of different soils in mapping units made up of soils from two or three series. Still another difference may be caused by the range in slope allowed within the mapping units for each survey.

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Soil	Dawson County	Lumpkin County	White County	Survey area	
	Acres	Acres	Acres	Total acres	Percent
Appling sandy loam, 6 to 10 percent slopes, eroded	1,195	5	420	1,620	0.3
Ashe and Edneyville stony loams, 10 to 25 percent slopes	25	1,670	500	2,195	.5
Ashe and Edneyville stony loams, 25 to 60 percent slopes	4,000	6,400	5,820	16,220	3.4
Ashe stony loam, 60 to 90 percent slopes	215	4,250	3,055	7,520	1.6
Augusta fine sandy loam, 2 to 6 percent slopes	680	415	750	1,845	.4

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Soil	Dawson County	Lumpkin County	White County	Survey area	
	Acres	Acres	Acres	Total acres	Percent
Augusta fine sandy loam, 6 to 10 percent slopes	415	255	220	890	0.2
Buncombe loamy sand	275	530	130	935	.2
Burton loam, 15 to 50 percent slopes	15	90	300	405	.1
Cartecay complex	2,310	2,875	3,630	8,815	1.9
Chandler loam, 25 to 60 percent slopes	0	1,215	240	1,455	.3
Congaree and Starr soils	1,885	1,555	1,310	4,750	1.0
Edneyville and Porters loams, 10 to 15 percent slopes	1,225	1,345	1,140	3,710	.8
Edneyville and Porters loams, 15 to 25 percent slopes	3,090	2,480	4,065	9,635	2.0
Edneyville and Porters loams, 25 to 60 percent slopes	4,165	5,475	11,035	20,675	4.3
Edneyville and Porters loams, 60 to 80 percent slopes	30	1,520	220	1,770	.4
Fannin fine sandy loam, 2 to 6 percent slopes	235	290	235	760	.2
Fannin fine sandy loam, 6 to 10 percent slopes	1,665	4,675	1,490	7,830	1.6
Fannin fine sandy loam, 10 to 25 percent slopes	9,685	10,950	7,610	28,245	5.9
Fannin sandy clay loam, 6 to 10 percent slopes, eroded	3,390	1,495	2,335	7,220	1.5
Fannin sandy clay loam, 10 to 25 percent slopes, eroded	5,335	2,515	4,220	12,070	2.5
Fannin soils, 25 to 60 percent slopes	0	55	955	1,010	.2
Gullied land	15	805	155	975	.2
Hayesville sandy loam, 2 to 6 percent slopes	1,095	345	1,275	2,715	.6
Hayesville sandy loam, 6 to 10 percent slopes	6,920	3,540	3,880	14,340	3.0
Hayesville sandy loam, 10 to 25 percent slopes	16,995	21,240	15,485	53,720	11.3
Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded	4,635	1,185	3,230	9,050	1.9
Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded	9,020	3,630	6,580	19,230	4.0
Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded	2,050	2,390	1,985	6,425	1.4
Hayesville and Rabun loams, 6 to 10 percent slopes	1,500	1,705	1,635	4,840	1.0
Hayesville and Rabun loams, 10 to 15 percent slopes	820	4,525	1,830	7,175	1.5
Hayesville and Rabun loams, 25 to 60 percent slopes	25	480	2,255	2,760	.6
Hiwassee loam, 2 to 10 percent slopes	1,480	1,865	1,320	4,665	1.0
Hiwassee loam, 10 to 15 percent slopes	590	2,150	2,060	4,800	1.0
Hiwassee loam, 15 to 40 percent slopes	155	2,075	45	2,275	.5
Masada fine sandy loam, 2 to 6 percent slopes	460	865	600	1,925	.4
Masada fine sandy loam, 2 to 6 percent slopes, eroded	1,330	470	680	2,480	.5
Masada fine sandy loam, 6 to 10 percent slopes, eroded	1,865	1,105	2,430	5,400	1.1
Masada fine sandy loam, 10 to 15 percent slopes, eroded	215	320	260	795	.2
Musella cobbly loam, 6 to 25 percent slopes	2,405	6,260	1,550	10,215	2.1

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Soil	Dawson County	Lumpkin County	White County	Survey area	
	Acres	Acres	Acres	Total acres	Percent
Musella cobbly loam, 25 to 70 percent slopes	2,295	9,725	865	12,885	2.7
Musella gravelly clay loam, 10 to 25 percent slopes, eroded	705	3,540	420	4,665	1.0
Rabun loam, 15 to 25 percent slopes	375	5,550	1,845	7,770	1.6
Rabun clay loam, 10 to 15 percent slopes, severely eroded	1,380	2,900	1,365	5,645	1.2
Rabun clay loam, 15 to 25 percent slopes, severely eroded	460	3,700	470	4,630	1.0
Rock land	95	990	635	1,720	.4
Starr fine sandy loam	740	640	370	1,750	.4
Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes	5,070	2,290	2,680	10,040	2.1
Tallapoosa fine sandy loam, 10 to 25 percent slopes	140	240	660	1,040	.2
Tallapoosa soils, 25 to 70 percent slopes	20,210	27,000	20,825	68,035	14.3
Toccoa soils	1,195	3,135	3,615	7,945	1.7
Tusquitee loam, 6 to 10 percent slopes	1,375	1,730	1,395	4,500	.9
Tusquitee loam, 10 to 25 percent slopes	2,415	3,695	6,600	12,710	2.7
Tusquitee loam, 25 to 60 percent slopes	70	2,290	3,270	5,630	1.2
Tusquitee stony loam, 10 to 25 percent slopes	875	2,125	2,920	5,920	1.2
Tusquitee stony loam, 25 to 60 percent slopes	1,140	2,395	4,995	8,530	1.8
Wehadkee soils	605	245	390	1,240	.3
Wickham fine sandy loam, 6 to 10 percent slopes	855	940	1,395	3,190	.7
Wickham fine sandy loam, 10 to 25 percent slopes	2,300	6,590	3,055	11,945	2.5
Wickham fine sandy loam, 25 to 50 percent slopes	20	1,470	390	1,880	.4
Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded	30	35	425	490	.1
Total	133,760	186,240	155,520	475,520	100.0

Appling Series

The Appling series consists of deep, well-drained soils that developed in residuum from materials weathered from gneiss and granitoid gneiss that are mixed with schist in places. These soils occur in upland areas of small to medium size and are very gently sloping to sloping. They are mainly in the south-central part of Dawson and White Counties.

Typically, in less eroded areas the surface layer is yellowish-brown to brown sandy loam about 7 inches thick. The upper part of the subsoil is strong-brown and brown clay loam, and the lower part, to a depth of about 52 inches, is brownish-yellow and yellowish-red clay loam that is mottled with red, brownish yellow, and pale brown. Few to many angular pebbles are on the surface and scattered throughout the profile. Depth to hard rock is more than 6 feet in most places.

The available water capacity is medium, and the permeability is moderate. The soils have a deep root zone. They are low in organic-matter content and natural fertility. These soils are easy to work, but they warm 15 to 20 days later in the spring than the redder soils such as the Fannin and Hayesville.

Appling soils commonly occur with Hayesville and Fannin soils, but they generally occur on broader, more gentle slopes. Appling soils are less red and have a thicker solum than the Hayesville and Fannin soils. They contain less mica than the Fannin soils.

Appling soils are well suited to farming, but they are not extensive in this survey area. Most of the acreage was formerly cleared and cultivated or pastured, but now most of it has been reforested, mainly to shortleaf pine. The native vegetation is mainly hardwoods, such as red, white, and post oaks, hickory, and blackgum. In addition, there are some shortleaf and loblolly pines.

Representative profile of Appling sandy loam, 6 to 10 percent slopes, eroded, located in a stand of loblolly pine, 0.3 mile south of Georgia State Highway No. 318 and 3.0 miles east of the intersection of Georgia State Highway No. 318 and U.S. Highway No. 19, Dawson County:

Ap--0 to 7 inches, yellowish-brown (10YR 5/4) and brown (10YR 4/3) sandy loam; weak, fine, granular structure; very friable; many fine roots; few small pores; few, small, angular, quartz pebbles; strongly acid; clear, smooth boundary.

B21t--7 to 15 inches, strong-brown (7.5YR 5/6) clay loam; moderate, fine, subangular blocky structure; friable; few patchy clay films on peds; few fine roots and pores; few, small, angular, quartz pebbles; strongly acid; clear, smooth boundary.

B22t--15 to 25 inches, brown (7.5YR 5/4) clay loam; common, medium, distinct, red (2.5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; clay films common on most peds; few medium roots; few angular quartz pebbles; strongly acid; clear, smooth boundary.

B31t--25 to 42 inches, brownish-yellow (10YR 6/6) clay loam; common, coarse, prominent, red (2.5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; very few thin clay films on peds; few, angular, quartz pebbles; strongly acid; clear, smooth boundary.

B32t--42 to 52 inches, yellowish-red (5YR 5/8) clay loam; common, coarse, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, distinct, very pale brown (10YR 8/4) mottles; weak, medium, subangular blocky structure; friable; strongly acid; gradual, smooth boundary.

C1--52 to 74 inches, mottled red (2.5YR 4/6), yellow (10YR 7/8), brown (10YR 5/3), and light-gray (10YR 7/2) sandy loam and loamy sand; contains fragments of partially weathered granite gneiss; very friable; strongly acid; clear, wavy boundary.

C2--74 inches +, partially weathered granite gneiss.

The Ap horizon is predominantly sandy loam, but it is sandy clay loam in small, severely eroded areas. The Ap horizon ranges from grayish brown to yellowish brown in color. Some areas have a B1 horizon of sandy clay loam. The B22t horizon ranges from strong brown to yellowish red in color and from clay loam to sandy clay in texture. Mottles range from few to common in the lower part of the B22t horizon. Thickness of the solum is 40 to 60 inches. Mica flakes and coarse sand grains are common in the lower B and C horizons in places. Depth to hard rock is 6 to 12 feet.

Appling sandy loam, 6 to 10 percent slopes, eroded (AmC2).--The surface layer of this soil ranges from 4 to 8 inches in thickness but generally is about 6 inches thick.

Some areas mapped as this soil contain inclusions in which the surface layer is loamy sand, and other areas contain a few severely eroded spots that have a sandy clay loam surface layer. In a few included areas the slopes are slightly more than 10 percent, and in a few others they are less than 6 percent. Small areas of the Hayesville and Tallapoosa soils are included in a few places. Here, the surface layer and subsoil have a total thickness of less than 40 inches.

This soil generally is easily worked and has a deep root zone. It is suited to moderately intensive use. All locally grown crops and pine trees are suited to this soil, which responds well to good management. The erosion hazard is moderate to moderately severe in cultivated fields. About half of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIIe-2; woodland group 11; wildlife group 1)

Ashe Series

The Ashe series consists of moderately shallow, sloping to very steep, excessively drained soils that formed in materials weathered from biotite

gneiss that contains narrow dykes of schist. These soils occur in the mountains or high ridges. They are on rounded, sloping to steep ridgetops and on short, broken side slopes. Mainly they are on southern and eastern exposures. The largest areas are in the higher mountains and extend in a somewhat northeasterly direction across the northern one-fourth of the survey area.

Typically, the surface layer consists of about 2 inches of very dark gray fine sandy loam over about 4 inches of dark yellowish-brown loam. The weakly developed subsoil is dark-brown loam. Below a depth of 15 inches is dark grayish-brown and light yellowish-brown fine sandy loam. At a depth of about 38 inches is partially weathered gneiss. Boulders, stones, and cobblestones are common on the surface.

These soils are low in natural fertility and low to moderately low in organic-matter content. Reaction is strongly acid to very strongly acid throughout the profile. Permeability is moderately rapid, and the available water capacity is low. The root zone is mainly moderately deep.

Ashe soils are associated with Edneyville, Porters, Burton, and Tusquitee soils. Ashe soils are shallower to bedrock than the Edneyville soils and have less clay in the subsoil than the Porters and Tusquitee soils. They have a thinner solum than Burton and Tusquitee soils.

Representative profile of an Ashe stony loam having slopes of 25 to 60 percent, located in a stand of hardwoods (0.6 mile south of Towns County line, on Indian Grave Road, 2.6 miles west of Tray Mountain, and 2.2 miles southeast of Unicoi Gap, White County):

O--2 inches to 0, layer of decomposed leaves and twigs.
A1--0 to 2 inches, very dark gray (10YR 3/1) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; high content of organic matter; about 6 percent stones; strongly acid; abrupt, wavy boundary.
A2--2 to 6 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small pores and root channels; 10 percent stones; strongly acid; clear, wavy boundary.
B1--6 to 9 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small pores and root channels; 12 percent rock fragments; strongly acid; clear, wavy boundary.
B2--9 to 15 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many fine mica flakes; common roots; many small pores; 8 percent rock fragments; strongly acid; clear, wavy boundary.
C--15 to 38 inches, dark grayish-brown (2.5Y 4/2) and light yellowish-brown (2.5Y 6/4) fine sandy loam; massive; very friable; few roots; 20 percent rock fragments; strongly acid; abrupt, clear boundary.
R--38 inches +, partially weathered gneiss.

The A1 horizon ranges from 2 to 6 inches in thickness and is very dark gray to dark grayish brown, olive gray, or olive brown in color. The texture ranges from stony sandy loam through stony fine sandy loam to stony loam. The B2 horizon ranges from about 6 to 16 inches in thickness and from dark brown or dark yellowish brown to strong brown. The texture of the B2 horizon is mainly loam, but it is sandy loam in some places. Rock fragments are scattered throughout the profile. Depth to hard rock is 2 to 5 feet in most places.

Ashe stony loam, 60 to 90 percent slopes (AcG).--In this soil the surface layer and the subsoil combined are generally less than 2 feet thick. The profile is similar to the one described as typical for the series. Depth to hard rock is 2 to 4 feet. This very steep and rocky soil has a shallow root zone.

This soil is wooded but is too steep for present methods of harvesting wood products and is better suited to wildlife. Included with this soil in mapping are rock outcrops, rock ledges where little or no soil has developed, and small areas of Tusquitee soils. (Capability unit VIIs-1; woodland group 4; wildlife group 5)

Ashe and Edneyville stony loams, 10 to 25 percent slopes (AEE).--In the soils of this undifferentiated unit, the surface layer ranges from 4 to 8 inches in thickness but generally is about 6 inches thick. Depth to hard rock is less than 5 feet in most places.

The unit is about 40 percent Ashe soil and 30 percent Edneyville soil. However, these proportions vary from one mapped area to another, and any given area may contain either soil or both. Included with these soils in mapping are a few areas of Porters soils, which have fewer stones on the surface than the soils of this unit, and small areas of Tusquitee soils that are more than 4 feet deep. Also included are rock outcrops and rock ledges.

Ashe and Edneyville soils are not easily worked, because of steep slopes and stones on the surface. The Ashe soil has a shallow root zone, and the Edneyville soil has a shallow to moderately shallow root zone.

The soils of this mapping unit are not suited to cultivated crops or pasture but are suited to woods and wildlife. Practically all of their acreage is wooded. (Capability unit VIIs-1; woodland group 5; wildlife group 5)

Ashe and Edneyville stony loams, 25 to 60 percent slopes (AEF).--These soils have the profiles described for their respective series. The surface layer ranges from 3 to 10 inches in thickness, but generally it is about 7 inches thick. In most places depth to hard rock is less than 4 feet.

These soils are mapped as an undifferentiated unit composed mainly of about 45 percent Ashe soil and 35 percent Edneyville soils. This proportion varies somewhat from one area to another, and any given area may contain either soil or both. Included with these soils are a few areas of Tusquitee soils, Porters soils, rock outcrops, and rock ledges.

Ashe and Edneyville stony loams are not suitable for farming. Steeper parts are somewhat droughty, but there are moist sites near the base of slopes and in colluvial depressions. These soils are not easily worked, because of steep slopes and stones and rocks on the surface. They are better suited to trees and wildlife, and almost all of the acreage has remained as woodland. (Capability unit VIIs-1; woodland group 4; wildlife group 5)

Augusta Series

The Augusta series consists of deep, somewhat poorly drained soils. These soils formed in old alluvium in small to medium-sized areas on low terraces, on foot slopes, and at the heads of drainageways. These areas generally are adjacent to flood plains and range from 3 to 10 acres in size.

Typically, these soils have a surface layer of dark grayish-brown fine sandy loam about 6 inches thick. The subsoil, between depths of 6 and 33 inches, is yellowish-brown, brownish-yellow, and light brownish-gray sandy clay loam and clay loam that is mottled below a depth of 10 inches. A few soft concretions are scattered in the subsoil in most areas. Below a depth of about 33 inches is mottled fine sandy loam containing some pebbles. Depth to hard rock is more than 6 feet in most places.

Natural fertility and content of organic matter are low. The available water capacity is medium. The reaction is strongly acid. Permeability is moderate through the subsoil, but the lower substratum tends to cause a perched water table. A seasonal high water table, commonly at a depth of 12 to 30 inches, influences the depth to which roots normally penetrate.

Augusta soils occur with Masada, Starr, Cartecay, and Wehadkee soils. Augusta soils contain gray mottles at a depth of about 10 inches, but the well-drained Masada and Starr soils are mottle free except in the lower part of the profile. The Augusta soils have a B horizon, but the stratified Cartecay soils do not. Augusta soils are not so poorly drained as the Wehadkee soils.

The Augusta soils are suited to crops such as corn, sorghum, and water-tolerant pasture plants. The crops respond well to fertilization and good management, although these soils are not important to farming, because of their small acreage and somewhat poor drainage. About half the acreage is pastured or cultivated; the rest is idle or wooded. The wooded areas are mainly in water-tolerant hardwoods such as gum, yellow-poplar, and maple, as well as some shortleaf pine.

Representative profile of Augusta fine sandy loam, 2 to 6 percent slopes, in an idle field (0.5 mile west of U.S. Highway No. 19, 300 yards north of the Etowah River, and 0.7 mile northeast of Nuclear Laboratory Headquarters, Dawson County):

Ap--0 to 6 inches, dark grayish-brown (2.5Y 4/2) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots and old root channels; strongly acid; clear, smooth boundary.

B1t--6 to 10 inches, yellowish-brown (10YR 5/4) sandy clay loam; moderate, medium, granular structure; friable; few fine mica flakes; few medium roots and root channels; strongly acid; clear, smooth boundary.

B21t--10 to 14 inches, yellowish-brown (10YR 5/6) clay loam; common, medium, distinct, light brownish-gray (10YR 6/2) mottles and few, fine, distinct, yellowish-red (5YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; few patchy clay films on peds; few fine mica flakes; few old root channels; strongly acid; clear, smooth boundary.

B22t--14 to 25 inches, brownish-yellow (10YR 6/6) clay loam; many, medium, distinct mottles of light brownish gray (10YR 6/2), red (2.5YR 5/8), and yellowish red (5YR 4/8); moderate, medium, subangular blocky structure; friable; thin clay films on many peds; few fine mica flakes; few small root channels; strongly acid; clear, smooth boundary.

B3t--25 to 33 inches, light brownish-gray (2.5Y 6/2) sandy clay loam; common, medium, distinct, yellowish-red (5YR 4/8) mottles; moderate, medium, subangular blocky structure; very friable; patchy clay films on some peds; common soft concretions; many fine mica flakes; strongly acid; clear, smooth boundary.

C--33 to 50 inches +, mottled light-gray (2.5Y 7/2), yellowish-brown (10YR 5/6) and red (2.5YR 4/8) fine sandy loam; massive; very friable; few concretions; common fine gravel; strongly acid.

The Ap horizon is mainly dark grayish-brown or grayish-brown to dark-gray fine sandy loam 4 to 8 inches thick. In some areas the texture is sandy loam. The B1t horizon is yellowish brown to dark yellowish brown. The B3t horizon is light brownish-gray to gray clay loam to sandy clay loam. Mottles are at or below a depth of 10 inches. The combined thickness of the A and B horizons ranges between 30 and 60 inches.

Augusta fine sandy loam, 2 to 6 percent slopes (AwB).--This soil has the profile described as typical for the series. In this soil the surface layer ranges from 4 to 8 inches in thickness, but it generally is about 5 inches thick. In most places depth to hard rock is more than 8 feet. Included with this soil in mapping are a few eroded

areas and a few places in which the subsoil contains many fine and medium pebbles. Also included are a few areas of Wehadkee soil that remain wet most of the time, and small areas of well-drained Masada soils.

This Augusta soil is limited in use because of wetness. It is difficult to work. The hazard of further erosion is slight to moderate in cultivated fields. About half of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIIw-3; woodland group 2; wildlife group 6)

Augusta fine sandy loam, 6 to 10 percent slopes (AwC).--The combined thickness of the surface layer and subsoil in this soil is generally 45 to 55 inches. Depth to hard rock is about 7 feet in most places. Included with this soil are a few severely eroded areas and a few places that remain wet because of constant seepage from adjacent slopes. In a few small areas, the surface soil is sandy loam. Also included are a few areas of Masada soils.

This soil generally is limited in use because of a high water table, small size of the areas, and slope. The hazard of erosion is moderate to moderately severe in cultivated areas. About one-third of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit VIe-2; woodland group 2; wildlife group 6)

Buncombe Series

The Buncombe series consists of deep, excessively drained soils that are nearly level to very gently sloping. These soils developed in recent alluvium in long narrow bands adjacent to the large streams. Individual areas range from 3 to 6 acres in size.

Typically, these soils have a surface layer of dark grayish-brown loamy sand about 7 inches thick. Beneath this, to a depth of about 70 inches, is dark-brown to brown loamy sand that is commonly mottled with pale brown and brownish yellow, especially in the lower part. Fine mica flakes are common to many in the profile.

The natural fertility and content of organic matter in these soils are low. Reaction ranges from strongly acid to medium acid. Permeability is rapid, and the available water capacity is low. The root zone is deep.

Buncombe soils occur with Congaree and Cartecay soils but are more sandy in the upper part of the profile and are more droughty.

Buncombe soils are suited to coastal bermudagrass, watermelons, corn, and early truck crops. However, the soils are not extensive in this survey area. About 60 percent of the acreage is pastured or cultivated; the rest is idle or wooded. The chief trees are oak, hickory, ash, yellow-poplar, birch, and gum. In addition, there are a few pines.

Representative profile of Buncombe loamy sand (2 percent slope) in wooded area at the fork of Chatteen and Tesnatee Creeks (2.3 miles north of Smith Chapel Church and 3.2 miles northwest of Shoal Creek Church, White County):

Ap--0 to 7 inches, dark grayish-brown (10YR 4/2) loamy sand; weak, fine, granular structure; very friable; many fine roots; many fine mica flakes; few small pores and root channels; strongly acid; clear, smooth boundary.

C1--7 to 17 inches, dark-brown (10YR 4/3) loamy sand; massive; very friable; many fine and medium roots; many fine mica flakes; many small and medium pores and root channels; strongly acid; clear, smooth boundary.

C2--17 to 44 inches, dark-brown (7.5YR 4/4) loamy sand; few, medium, distinct, pale-brown (10YR 6/3) mottles; massive; very friable; few fine and medium roots; many fine mica flakes; few small and medium pores; strongly acid; clear, smooth boundary.

C3--44 to 70 inches, dark-brown (7.5YR 4/4) loamy sand; common, medium, pale-brown (10YR 6/3) mottles and few, medium, brownish-yellow (10YR 6/6) mottles and black specks; massive; very friable; many medium roots; many fine mica flakes; few small and medium pores; strongly acid.

The Ap horizon ranges from loamy sand to gravelly sand in texture and from dark grayish brown to light olive brown in color. The C horizons range from loamy fine sand in the C1 horizon to gravelly sand in the C3 horizon. The color ranges from light olive brown to dark brown. Depth to hard rock ranges from 6 feet to more than 10 feet.

Buncombe loamy sand (0 to 6 percent slopes) (Bfs).--This is the only Buncombe soil mapped in the survey area. Slopes are dominantly less than 3 percent but, in a few small areas, are as steep as 6 percent. The areas are adjacent to large streams and are subject to brief flooding late in winter and in spring. Some deposition and scouring occur. Included with this soil are small areas of Congaree and Cartecay soils.

This soil is suited to only a few of the commonly grown crops because of the rapid permeability and low available water capacity. Plant nutrients are readily leached from this soil; therefore, frequent applications of plant nutrients are needed for best crop response. (Capability unit IIIs-1; woodland group 1; wildlife group 6)

Burton Series

The Burton series consists of moderately deep to deep, well drained to moderately well drained soils that formed in materials weathered chiefly from gneiss and schist. These soils occur in small areas in saddles around the heads of drains, near tops of mountains. They are strongly sloping to steep, and the exposure is chiefly northerly. The distribution is mainly in the northern one-fourth of the survey area at elevations of about 3,000 feet and more.

Typically, these soils have a surface layer of black loam about 19 inches thick. The subsoil is

dark grayish-brown loam. Depth to hard rock is more than 4 feet in most places.

These soils are medium to high in natural fertility and high in organic-matter content. Reaction is strongly acid to medium acid throughout the profile. Permeability is moderate to moderately rapid, and the available water capacity is high. The root zone is mainly moderately deep.

Burton soils occur with Porters, Ashe, and Tusquitee soils. They have a thicker and darker A1 horizon than the Ashe soils, and they lack the B2t horizon of the Porters soils. Burton soils have a thinner solum than the Tusquitee soils.

Burton soils are not suited to farming, because of their steep slopes, inaccessibility in the higher mountains, and small acreage. Most of the acreage has remained in trees, chiefly yellow-poplar, black locust, oak, birch, and some white pine. The understory is mainly laurel and rhododendron.

A representative profile of Burton loam, 15 to 50 percent slopes, located in a stand of hardwoods at Nimblewill Gap (4.0 miles northeast of Amicalola Falls State Park and 5.0 miles northeast of Johntown, Dawson County):

O1--1 inch to 0, partially decomposed vegetative matter.
A11--0 to 14 inches, black (N 2/0) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small pores and root channels; medium acid; clear, smooth boundary.
A12--14 to 19 inches, very dark grayish-brown (2.5Y 3/2) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small pores and root channels; medium acid; clear, wavy boundary.
B--19 to 32 inches, dark grayish-brown (10YR 4/2) loam; weak, fine, granular structure; very friable; many fine mica flakes; few medium and fine roots; few medium pores and root channels; medium acid; clear, wavy boundary.
C1--32 to 38 inches, dark grayish-brown (2.5Y 4/2) sandy loam; massive; very friable; many fine and medium mica flakes; few fine and medium pores; many schist fragments; few angular pebbles and cobblestones of gneiss; medium acid; clear, smooth boundary.
C2--38 inches +, partially weathered gneiss, with narrow dykes of schist.

The A horizons range from loam to sandy loam in texture and from black to very dark grayish brown in color. The B horizon ranges from loam to light sandy clay loam and is dark grayish brown to dark yellowish brown. A few light olive-brown to pale-brown mottles may occur in the lower part of the B horizon. The solum ranges from about 25 to 36 inches in thickness, but in most places it is about 30 to 32 inches thick. Fine mica flakes and angular pebbles and cobblestones range from none to many in the solum. Depth to hard rock ranges from 3 to 8 feet.

Burton loam, 15 to 50 percent slopes (BvF).--This is the only Burton soil mapped in the survey area. It lies near the tops of mountains, in saddles, and around the heads of drains, and it is subject to seepage for long periods. Included in areas mapped as this soil is a small acreage of a Burton stony loam that has a solum 10 to 15 inches thinner than the one described in the representative profile. Also included are a few areas of Tusquitee loam and Porters loam.

This soil is not suited to crops and pasture, because it is sloping to steep and occurs in small isolated areas. (Capability unit VIIe-1; woodland group 7; wildlife group 4)

Cartecay Series

The Cartecay series consists of somewhat poorly drained to moderately well drained soils that formed in alluvium. The slopes range from 0 to 2 percent. These soils occur mainly on narrow flood plains of streams through Dawson, Lumpkin, and White Counties.

In many places the surface layer is dominantly brown and is about 5 inches thick. The texture of this layer ranges mainly from loam to loamy sand. Beneath the surface layer, to a depth of about 40 inches, is reddish-yellow, pale-brown, and light grayish-brown material that is of variable texture and has yellowish-brown, strong-brown, and light-gray mottles in the lower part. Depth to hard rock is more than 6 feet in most places.

These soils are medium acid. Natural fertility is low, and the organic-matter content is moderate. The permeability is moderately rapid, and the available water capacity is medium to low. The root zone is deep.

The Cartecay soils are adjacent to Congaree, Starr, Wehadkee, Toccoa, Buncombe, and Augusta soils. They contain less clay than Congaree, Starr, Wehadkee, and Augusta soils. The Cartecay soils are better drained than Wehadkee soils, but they are more poorly drained than the Congaree, Starr, and Toccoa soils and the excessively drained Buncombe soils.

The soils of the Cartecay series are not extensive in the three-county area, but they occur along most streams. The native trees are gum, elm, alder, oak, and sycamore, and there is an understory of weeds and vines. Some areas are cultivated and pastured.

Representative profile of a Cartecay fine sandy loam (3.9 miles north of the Hall County-White County line on U.S. Highway No. 129, 300 feet east of the highway, White County):

Ap--0 to 5 inches, brown (10YR 5/3) fine sandy loam; common fine, distinct, grayish-brown (2.5Y 5/2) mottles; weak, fine, granular structure; very friable; many fine roots; common mica flakes; medium acid; gradual, smooth boundary.

C1--5 to 15 inches, reddish-yellow (5YR 6/6) loam; many, medium, distinct, pale-brown (10YR 6/3) mottles; and common, fine, black mottles; weak, medium, granular structure; very friable; few fine roots; many fine mica flakes; few fine pebbles; medium acid; gradual, smooth boundary.

C2--15 to 23 inches, pale-brown (10YR 6/3) fine sandy loam; common, medium, distinct, strong-brown (7.5YR 5/6) and light-gray (10YR 7/2) mottles; massive; friable to very friable; few fine roots; many fine mica flakes; few coarse sand grains and small pebbles; thin bedding planes; medium acid; gradual, smooth boundary.

C3--23 to 52 inches +, light brownish-gray (2.5Y 6/2) loamy sand to sandy loam; many, medium, distinct, yellowish-brown (10YR 5/8) mottles; few, fine, distinct, reddish-yellow (7.5YR 6/6), mottles; and few, fine, black mottles; massive; very friable; many fine mica flakes; common fine and medium gravel in lower part; thin bedding planes; medium acid.

The very dark grayish-brown, yellowish-brown, or brown Ap horizon ranges from 4 to 8 inches in thickness. The texture is loamy sand to loam. The C horizons range from 38 to 48 inches in thickness. They are mainly sandy loam, but are stratified and thin bedding planes are evident. The colors range from reddish yellow through yellowish brown, pale brown, and light brownish gray. Gray mottles occur at a depth of 15 to 20 inches.

Cartecay complex (0 to 2 percent slopes) (CaC).--The surface layer of the soils in this complex is variable in texture and ranges between loamy sand and silt loam. The mapped areas along the stream flood plains are subject to frequent, brief flooding in the winter and occasional flooding during the growing season. Included with these soils are small areas of Toccoa, Congaree, Starr, and Wehadkee soils. In a few places slopes range to 6 percent. (Capability unit IIIw-2; woodland group 2, wildlife group 6)

Chandler Series

The Chandler series consists of steep to very steep, somewhat excessively drained soils that formed in materials weathered from mica schist and mica gneiss. These soils occur in the mountains and on higher ridges. They occur on the narrow ridgetops and on short, broken hillsides highly dissected by drainageways. The largest areas are about 1.6 miles south of Dahlonega in Lumpkin County and in the northeastern part of White County, but small isolated areas are scattered throughout the mountains.

Typically, these soils have a surface layer of dark-brown and dark yellowish-brown loam about 9 inches thick. The subsoil, about 7 inches thick, is dark-brown loam. Below a depth of about 16 inches is brown, loamy, highly weathered, micaceous schist material about 56 inches thick. Chandler soils are deeply weathered. Depth to hard rock is generally more than 8 feet.

These soils are low in natural fertility and organic-matter content. Reaction is strongly acid throughout the profile. Permeability is moderately rapid, and the available water capacity is low. The root zone is generally deep.

Chandler soils occur with Tallapoosa and Fannin soils. Chandler soils are more deeply weathered, contain less clay, and are browner than the Tallapoosa soils. They are not so red as the Fannin soils.

Chandler soils are not suited to farming. Only a small area was once cleared but it now has reverted to woodland. The chief trees are red and post oaks, blackgum, sourwood, and shortleaf, Virginia, and pitch pines.

Representative profile of Chandler loam, 25 to 60 percent slopes, located in an area of mixed hardwoods and pines (2.1 miles south of Dahlonega and 50 feet west of Georgia Highway No. 249, Lumpkin County):

O1--1 inch to 0, loose litter and fermentation products.

A1--0 to 5 inches, dark yellowish-brown (10YR 4/4) loam; weak, fine, granular structure; very friable; fine mica flakes; few angular quartz pebbles; strongly acid; gradual, smooth boundary.

A3--5 to 9 inches, dark-brown (10YR 4/3) loam; weak, fine, granular structure; very friable; many fine roots; many fine mica flakes; few small pores; strongly acid; gradual, smooth boundary.

B--9 to 16 inches, dark-brown (7.5YR 4/4) loam; weak, fine, granular structure (or massive in some places); very friable; many fine roots; very micaceous; few small pores; strongly acid; diffuse boundary.

C--16 to 72 inches, brown (10YR 5/3) loam; few, fine, distinct, very dark brown (10YR 2/2) and yellowish-red (5YR 4/6) mottles; massive; very friable; few fine roots in the upper part; very micaceous; few small pores; graphitic schist with injections of mica gneiss; strongly acid.

The A1 horizon is predominantly loam, but it ranges from loam to fine sandy loam or gravelly fine sandy loam that is high in mica content. The color ranges from dark yellowish brown to dark brown. The B horizon ranges from loam to sandy loam in texture and from dark brown to yellowish brown in color. It is 7 to 24 inches thick. There are no clay films.

Chandler loam, 25 to 60 percent slopes (CCF).--This is the only Chandler soil mapped in the survey area. It occupies narrow, strongly sloping ridgetops and strongly sloping to steep, broken hillsides that have a dendritic drainage pattern. Included with this soil are small areas of Tallapoosa and Fannin soils and small areas of a soil with a red subsoil.

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Because this Chandler loam is steep and has a low available water capacity, it is not suited to cultivation and pasture. (Capability unit VIIe-2; woodland group 12; wildlife group 5)

Congaree Series

The Congaree series consists of deep, nearly level, well-drained soils. These soils formed in fairly wide bands of alluvium on flood plains along the larger streams in the survey area. Individual areas range from 3 to 12 acres in size.

Typically, these soils have a surface layer of dark grayish-brown silt loam to fine sandy loam about 10 inches thick. Below this is mainly stratified dark-brown and dark grayish-brown silt loam and fine sandy loam. Depth to hard rock is more than 8 feet in most places.

The natural fertility and content of organic matter in these soils are moderate to low. Reaction is strongly acid in the upper part of the profile and medium acid in the lower part. Permeability is moderately rapid. The available water capacity is medium, and the root zone is deep.

Congaree soils occur with Starr, Cartecay, Toccoa, Masada, Buncombe, and Wehadkee soils and occupy similar areas. The Starr and Masada soils have a B horizon, whereas the Congaree soils do not. Cartecay and Toccoa soils are medium acid and coarser textured. Buncombe soils are somewhat excessively drained and are coarser textured than the Congaree soils. The Wehadkee soils are poorly drained and have gray mottles near the surface.

Congaree soils are suited to most crops grown in the survey area and can be cultivated intensively. The crops respond well to fertilization and good management. About 80 percent of the acreage is pastured or cultivated; the rest is wooded or idle. The chief trees are oak, hickory, yellow-poplar, gum, maple, and a few pines.

Representative profile of a Congaree silt loam located in a pasture (one-quarter mile east of Nacoochee Church, 75 yards west of Sautee Creek, and 200 yards north of dirt road, White County):

Ap--0 to 10 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; very friable; many fine mica flakes; many roots and pores; strongly acid; abrupt, smooth boundary.

C1--10 to 25 inches, dark-brown (10YR 4/3) loam; massive; very friable; many fine mica flakes; many fine roots; fine pores; strongly acid; abrupt, smooth boundary.

C2--25 to 31 inches, dark-brown (10YR 3/3) silt loam; massive; many fine mica flakes; few fine roots; many fine pores; strongly acid; abrupt, smooth boundary.

C3--31 to 36 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; massive; many fine mica flakes; few fine pores; medium acid; abrupt, smooth boundary.

C4--36 to 50 inches +, dark grayish-brown (10YR 4/2) fine sandy loam; common, fine, distinct, yellowish-red (5YR 4/8) mottles; massive; very friable; many mica flakes; medium acid.

The Ap horizon generally is dark grayish-brown to brown loam 8 to 12 inches thick. In some places the texture is fine sandy loam or silt loam. The C horizons are dark-brown to very dark grayish-brown or yellowish-brown loam to silt loam that is stratified with layers of sandy loam or loamy sand, generally in the lower parts. Thickness of the alluvial material is generally 6 to more than 10 feet. Depth to hard rock is more than 8 feet.

Congaree and Starr soils (0 to 2 percent slopes) (Con).--The Congaree soils in this mapping unit generally are dominant, but any given area of the unit may contain either or both Congaree and Starr soils. The surface layer of these soils is dominantly loam or fine sandy loam, but it ranges to silt loam. The soils are on flood plains and are subject to brief flooding late in winter and early in spring.

Included with these soils in mapping are small areas of Cartecay and Toccoa soils, as well as small areas that have slopes of 2 to 6 percent and occur on foot slopes and around drainage heads.

Because these soils have a deep root zone, are easily worked, and are nearly level, they are suited to most of the commonly grown crops (pl. II, bottom). They respond well to fertilization and good management. (Capability unit IIw-2; woodland group 1; wildlife group 6)

Edneyville Series

The Edneyville series consists of moderately deep, well-drained soils that formed in materials weathered from biotite gneiss and narrow dykes of schist. These soils are in the higher mountains. They are on rounded, sloping to steep ridgetops and on short, broken, steep to very steep mountains sides, generally on south-facing and east-facing slopes. The largest areas are in the higher mountains and extend somewhat in a northeasterly direction across the northern one-fourth of the survey area.

Typically, Edneyville soils have a surface layer of olive-brown loam about 6 inches thick. The subsurface layer is yellowish-brown loam about 8 inches thick. Below this is a weakly developed subsoil of yellowish-brown loam and clay loam. At a depth of about 25 inches is strong-brown and yellowish-brown fine sandy loam. Depth to hard rock is about 48 inches.

These soils are low in natural fertility and low to moderately low in organic-matter content. They are strongly acid in reaction. Permeability is moderate, and the available water capacity is low to medium. The root zone is mainly moderately deep.

Edneyville soils are associated with Ashe, Porters, Hayesville, and Tusquitee soils. They have a

somewhat thicker solum than the Ashe soils, and they have more yellow in the subsoil and a grayer surface layer than the Hayesville and Porters soils. They have a thinner solum than the Tusquitee soils.

Edneyville soils were not mapped separately in this survey area. They are a part of Ashe and Edneyville stony loams, which are described under the Ashe series, and the Edneyville and Porters loams. Most areas of Edneyville soils are not well suited to cultivated crops or pasture. Most of the acreage has remained in trees, chiefly red, post, and chestnut oaks, hickory, pine, and sourwood.

Representative profile of an Edneyville loam having slopes of 25 to 60 percent, located in a stand of hardwoods (0.7 mile east of Dawson-Gilmer County line on the northern side of Georgia Highway No. 52, 3.7 miles northwest of Amicalola Falls State Park, and 3.5 miles northwest of Johntown, Dawson County):

O1--2 inches to 0, decomposed leaves and twigs.
A1--0 to 6 inches, olive-brown (2.5Y 4/4) loam; weak, fine, granular structure; very friable; many fine roots and small pores; 5 percent stone fragments; strongly acid; gradual, wavy boundary.
A2--6 to 14 inches, yellowish-brown (10YR 5/8) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; common small pores; 8 percent stone fragments; strongly acid; gradual, wavy boundary.
B1--14 to 21 inches, yellowish-brown (10YR 5/6) loam; weak, fine, granular structure; very friable; few fine mica flakes; few fine and medium roots; many small pores and root channels; 5 percent rock fragments; strongly acid; gradual, wavy boundary.
B2t--21 to 25 inches, strong-brown (7.5YR 5/6) light clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; few medium roots; few small pores; 5 percent rock fragments; strongly acid; gradual, wavy boundary.
C--25 to 48 inches, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/6) fine sandy loam; massive; very friable; 25 percent rock fragments; strongly acid; abrupt, wavy boundary.
R--48 to 60 inches +, granite and gneiss; common feldspar crystals.

The A1 horizon of Edneyville soils is generally dark-brown loam or sandy loam. The combined thickness of the A1 and A2 horizons ranges from 6 to 15 inches. The B horizon ranges from yellowish-brown to strong-brown loam or clay loam. The combined thickness of the A and B horizons ranges from 22 to 38 inches. Boulders, stones, and cobblestones occur on the surface of these soils in some areas. Depth to hard rock is 4 to 6 feet in most places.

Edneyville and Porters loams, 10 to 15 percent slopes (EPD).--In any given area mapped as this undifferentiated unit, either the Edneyville soil or the Porters soil, or both, may be present. Generally, the Edneyville soil is dominant. The profile of the Porters soil is the one described as representative for the Porters series. Soils of this unit occur on moderate to long, narrow ridgetops in areas about 10 to 30 acres in size.

Some areas mapped as this unit contain inclusions of similar soils that have a fine sandy loam or cobbly loam surface layer. The subsoil normally is light clay loam 12 to 20 inches thick, but in places it is loam or clay loam. The lower subsoil generally has a high content of rock fragments.

Where cultivated, these soils are suited to locally grown truck crops, corn, and pasture. The chief trees are hardwoods and white pine. Crops respond well to fertilization and good management. Runoff is medium to moderately rapid in sparsely vegetated and cultivated areas. Most of the acreage has remained in trees. (Capability unit IVe-1; woodland group 5; wildlife group 5)

Edneyville and Porters loams, 15 to 25 percent slopes (EPE).--Any given area of this mapping unit may contain only the Edneyville soil, only the Porters soil, or both soils. Generally, the Edneyville soil is dominant. These soils occur in long, broken areas about 15 to 70 acres in size. Rock fragments range from few to common in the profile. Some areas mapped as this unit contain inclusions having a fine sandy loam or a cobbly loam surface layer. The subsoil in small included areas is loam and sandy clay loam. Also included with these soils are small areas of Hayesville sandy loam, Ashe stony loam, and Tusquitee soils. Small areas of a more clayey soil formed in material weathered from acid and basic rock are also included.

Runoff is moderately rapid to rapid in sparsely vegetated areas. The erosion hazard in these areas therefore is moderately severe to severe. These soils are suited to pasture, hardwoods, and white pine and have remained in woods. (Capability unit VIe-1; woodland group 5; wildlife group 5)

Edneyville and Porters loams, 25 to 60 percent slopes (EPF).--These soils occur in long, broken areas about 20 to 90 acres in size. The Porters soil, which occurs in small depressed areas, has a thicker and darker surface layer than the Edneyville soil.

Some areas of this mapping unit contain inclusions where the surface layer is fine sandy loam or cobbly loam. Also included with these soils are small areas of Hayesville sandy loam, Ashe stony loam, and Tusquitee soils, as well as small areas of a soil formed in material weathered from acid and basic rock. Small areas of strongly sloping and very steep soils are also included.

In sparsely vegetated areas, the erosion hazard is severe to very severe because of rapid to very rapid runoff. These soils have remained in trees. They are suited to hardwoods and white pine. (Capability unit VIIe-1; woodland group 6; wildlife group 5)

Edneyville and Porters loams, 60 to 80 percent slopes (EPG).--Any given area of this mapping unit may contain only Edneyville soil, only Porters soil, or both soils. In most areas the Edneyville soil is dominant. The mapping unit occurs in short, broken areas about 15 to 35 acres in size. The Porters soil generally occurs in small depressed areas and has a browner surface layer than the Edneyville soils. In small included areas the surface layer is cobbly and stony fine sandy loam. The subsoil is loam 6 to 12 inches thick, except in inclusions that have a subsoil of clay loam. Rock fragments are few to common in the profile. Also included with these soils are small areas of Ashe and Tusquitee soils and Rock land, as well as small areas of steep soils.

Because they are shallow and very steep, the soils of this unit are limited mainly to hardwood trees. Timber harvesting is hazardous. The erosion hazard is very severe in all but the densely vegetated areas. (Capability unit VIIe-1; woodland group 6; wildlife group 5)

Fannin Series

The Fannin series consists of moderately deep to deep, well-drained soils of the uplands that formed in material weathered from mica schist and mica gneiss. These soils generally occur throughout the southern two-thirds of the survey area, but a few isolated areas are in the mountains. The Fannin soils are in medium-sized to large areas on very gently sloping to sloping, narrow to moderately wide ridgetops and on sloping to steep side slopes that have a dendritic drainage pattern.

Typically, the surface layer in the less eroded areas is dark-brown fine sandy loam about 6 inches thick. Underlying this is a 4-inch subsurface layer of brown fine sandy loam. The subsoil, about 28 inches thick, is mainly yellowish-red and red sandy clay loam, clay loam, and silty clay loam. Below a depth of about 38 inches is red fine sandy loam. Fine mica flakes are in the profile and increase with depth. Depth to hard rock is more than 5 feet in most places.

These soils are low in natural fertility and low in organic-matter content. They are strongly acid. Permeability is moderate, and the available water capacity is medium. The root zone is moderately deep to deep.

Fannin soils commonly occur with Hayesville, Appling, Tallapoosa, Rabun, Hiwassee, Wickham, and Chandler soils. They are more micaceous in the lower part of the profile than the Hayesville, Appling, and Wickham soils, and they have a thicker solum than the Chandler and Tallapoosa soils. The subsoil of Fannin soils is less clayey, is lighter red, and has a higher mica content than that of the Rabun and Hiwassee soils.

Fannin soils are extensive in this survey area and are well suited to farming in the more gently sloping areas. About one-third of the acreage on the more gentle slopes is cultivated or used for pasture. The chief trees are oak, hickory, black locust, dogwood, and shortleaf, Virginia, and white pines. There is an understory of huckleberries and wild azaleas.

Representative profile of Fannin fine sandy loam, 10 to 25 percent slopes (2.4 miles east of the Lumpkin-White County line, 4.6 miles northwest of Mt. View Church, and 5.2 miles west of Cleveland on paved county road, White County):

O--1 inch to 0, decomposed leaves and twigs.
A1--0 to 6 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; very friable; many fine mica flakes; many fine roots; strongly acid; abrupt, smooth boundary.
A2--6 to 10 inches, brown (7.5YR 5/4) fine sandy loam; weak, fine, granular structure; very friable; many fine mica flakes; many fine roots; strongly acid; gradual, wavy boundary.
B1t--10 to 13 inches, yellowish-red (5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable to very friable; few patchy clay films on some peds; many fine mica flakes; many medium roots; few small pores; strongly acid; gradual, wavy boundary.
B2t--13 to 24 inches, red (2.5YR 4/6) clay loam; moderate, medium, subangular blocky structure; friable; many patchy clay films on peds; many fine mica flakes that give a slick feel; few medium roots and small pores; strongly acid; gradual, wavy boundary.
B3t--24 to 38 inches, red (2.5YR 4/6) silty clay loam; weak and moderate, medium, subangular blocky structure; friable; few patchy clay films on some peds; many fine mica flakes; few medium roots; few small pores and schist fragments; strongly acid; gradual, wavy boundary.
C--38 to 58 inches, red (2.5YR 4/6) fine sandy loam; light reddish-yellow (5YR 6/6) schist; massive; very friable; many, fine, mottled fragments of mica schist; few medium roots; strongly acid.

The A1 horizon ranges from dark grayish brown through dark brown or dark reddish brown in color and from fine sandy loam to sandy clay loam in texture. A few areas have a gravelly sandy loam A horizon. Some areas have a B1 horizon that is heavy sandy loam.

The B2t horizon ranges from strong brown to red and from fine sandy clay loam to clay loam. Small isolated areas in the mountains have a B2t horizon that is strong brown in the upper part and yellowish red in the lower part. Areas with some basic schist influence have a more clayey B2t horizon that is one or two hues redder in color than that described in the typical profile. Mica flakes increase with depth. Thickness of the solum is 30 to 42 inches. Narrow quartz dykes, 1 to 3 inches thick, generally occur from 10 to 25 feet apart. Depth to hard rock is more than 5 feet in most places.

Fannin fine sandy loam, 2 to 6 percent slopes (FaB).--The surface layer of this soil ranges from

5 to 10 inches in thickness, but generally is about 8 inches thick. The subsoil is 2 to 3 feet thick but generally is around 30 inches thick. Depth to hard rock is more than 8 feet in most places.

Included with this soil in mapping are a few small areas with a gravelly sandy loam surface layer, small eroded areas that have a sandy clay loam plow layer, small areas having slopes of slightly more than 6 percent slopes, and small areas of Hayesville sandy loam. Also included is a small acreage of a similar soil having a surface layer and subsoil approximately 46 inches in combined thickness and located in the southern part of the survey area.

This Fannin soil is easily worked and is well suited to moderately intensive use. It is suited to most commonly grown crops and pine trees. Crops respond well to fertilization and good management. The hazard of erosion is slight to moderate in cultivated areas. About one-half of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIe-3; woodland group 13; wildlife group 1)

Fannin fine sandy loam, 6 to 10 percent slopes (FaC).--The surface layer of this soil is 4 to 10 inches thick but generally is around 7 inches thick. Thickness of the subsoil ranges from 2 to 3 feet, but normally is 26 to 30 inches. Depth to hard rock is more than 7 feet in most places.

Included with this soil are a few small areas with a gravelly sandy loam surface layer, small eroded areas that have a sandy clay loam surface layer, and small areas of Hayesville and Musella soils. Also included is a soil that has a surface layer and subsoil about 48 inches in total thickness. This included soil is in the southern part of the survey area.

This Fannin soil is easily worked, has a moderately deep to deep root zone, and is well suited to moderately intensive use. It is suited to most commonly grown crops and pine trees. Crops respond well to fertilization and good management. The hazard of erosion is moderate to moderately severe in cultivated areas. About half of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIIe-3; woodland group 13; wildlife group 1)

Fannin fine sandy loam, 10 to 25 percent slopes (FaE).--The profile for this soil is the one described as representative for the series. Depth to hard rock is more than 5 feet in most places.

Included with this soil are small areas with a gravelly sandy loam surface layer and other small areas that have schist fragments on the surface. Also included are small areas of Hayesville, Musella, and Tallapoosa soils.

This soil is not suited to intensive use, because of steep slopes, a severe erosion hazard, and moderately rapid to rapid runoff in cultivated areas. Hay and pasture crops respond well to fertilization and good management. Less than one-fourth of the acreage is cultivated or pastured. The rest is wooded or idle. (Capability unit VIe-1; woodland group 13; wildlife group 2)

Fannin sandy clay loam, 6 to 10 percent slopes, eroded (FbC2).--This soil has a plow layer, generally 3 to 7 inches thick, that is dark reddish-brown to strong-brown sandy clay loam and contains some subsoil material. The subsoil is mainly red to yellowish-red fine sandy clay loam 20 to 30 inches thick. Depth to hard rock is more than 7 feet.

Included with this soil in mapping are small areas that have a surface layer of fine sandy loam, gravelly sandy loam, or gravelly clay loam. Also included are small areas having slopes of slightly less than 6 percent and small areas of a similar soil, occurring in the southern part of the survey area, that has a surface layer and subsoil with a combined thickness of about 48 inches.

This Fannin soil is of limited use because it has a sandy clay loam surface layer and is cut by a few shallow gullies. It is suited to most commonly grown crops and pine trees. Crops respond well to fertilization and good management. The hazard of further erosion is severe in cultivated areas, and only about one-third of the acreage is cultivated or pastured. The rest is idle or has been reforested, mainly to Virginia and shortleaf pines. (Capability unit IVe-2; woodland group 14; wildlife group 3)

Fannin sandy clay loam, 10 to 25 percent slopes, eroded (FbE2).--This soil has a plow layer of dark reddish-brown to strong-brown sandy clay loam that is 3 to 5 inches thick and contains some material brought up from the subsoil. The subsoil is red to yellowish-red sandy clay loam 15 to 24 inches thick. Depth to hard rock is generally more than 5 feet.

Included with this soil are small areas with a fine sandy loam, gravelly sandy loam, or gravelly clay loam surface layer. Also included are small areas of Hayesville, Rabun, and Musella soils, as well as small areas of a soil that has a surface layer and subsoil approximately 48 inches thick. This unnamed soil occurs in the southern part of the survey area.

This Fannin soil is difficult to work because of its strong slopes, sandy clay loam surface layer, and some shallow to moderately deep gullies. This soil is not suited to intensive use. Only a small acreage is cultivated. About one-fifth of the acreage is in pasture; the rest is idle or has been reforested, mainly to Virginia and shortleaf pines. (Capability unit VIe-1; woodland group 14; wildlife group 3)

Fannin soils, 25 to 60 percent slopes (FcF).--These soils occur on broken, high ridgetops and mountaintops and on steep hillsides in areas about 5 to 15 acres in size. The profile of these soils differs from the one described as typical for the series in that the surface layer is very dark grayish brown and variable in texture. Texture ranges mainly from sandy loam to loam, and the surface layer and subsoil are slightly thinner. The subsoil is 15 to 22 inches thick. Depth to hard rock is more than 6 feet in most places.

Included with this soil are small areas that have schist fragments or small gravel on the surface. Also included are small areas of Tallapoosa, Chandler, and Hayesville soils.

These Fannin soils are not suited to farming, because of steep slopes and a very severe erosion hazard. Most of the acreage has remained in trees. (Capability unit VIIe-1; woodland group 14; wildlife group 4)

Gullied Land

Gullied land (Gul) is a miscellaneous land type consisting of areas in which the soil profile has been destroyed by erosion. This land is made up of gullied areas where hydraulic mining was done, where abandoned roads were washed out, and where borrow pits on steep slopes were cut into the parent material and eroded. Some of the gullies are more than 75 feet deep. The wider ones are more than 100 feet wide.

Most of the Gullied land is in Lumpkin County where the gullies were washed out during gold mining operations. Most of this mining was done in Fannin, Rabun, Musella, and Tallapoosa soils. The areas mapped as Gullied land are approximately 60 percent gullies and 40 percent soil between the gullies. Only remnants of the original profiles remain. More than 90 percent of the gullies are stabilized with trees and vegetation. Most of this land is reforested. Some of it is idle. Vegetation is mainly stunted trees on sides of gullies and taller trees in the bottoms. (Capability unit VIIe-4; woodland group and wildlife group not assigned)

Hayesville Series

The Hayesville series consists of moderately deep to deep, well-drained soils. These soils formed in materials weathered mainly from gneiss but, in places, partly from schist, granite, quartzite, and some basic material. Hayesville soils are in medium-sized to large areas on very gently sloping to sloping, medium to moderately wide ridgetops and on sloping to steep hillsides that have a dendritic drainage pattern. They are the most extensive soils in the survey area, and they are scattered throughout the southern three-fourths of it.

Typically, in the less eroded areas the surface layer is strong-brown sandy loam in the upper 4 inches and yellowish-red fine sandy loam in the lower 5 inches. The subsoil, about 22 inches thick, is yellowish-red and red fine sandy clay loam, clay, and clay loam. Below a depth of about 31 inches is dark reddish-brown fine sandy loam and fine sandy clay loam. A few fine mica flakes are in the profile. Depth to hard rock is more than 6 feet in most places.

Permeability is moderate. Natural fertility and the content of organic matter are low. Reaction is strongly acid throughout the profile. The available water capacity is medium, and the root zone is moderately deep to deep.

Hayesville soils commonly occur with Appling, Fannin, Tallapoosa, Wickham, Hiwassee, Porters, and Rabun soils. They are not so highly micaceous as the Fannin soils. Hayesville soils have thicker B horizons than the Porters and Tallapoosa soils. They have a thinner solum than the Wickham soils. Their B2t horizon is not so dark red as that of the Rabun and Hiwassee soils.

Hayesville soils are well suited to farming. About one-third of the acreage on the more gentle slopes is cultivated or pastured; the rest is wooded or idle. In natural wooded areas the chief trees are oak, hickory, sourwood, dogwood, and shortleaf, Virginia, and white pines. There is an understory of laurel and rhododendron at high elevations. Reforested areas are generally in Virginia and shortleaf pines.

Representative profile of Hayesville sandy loam, 10 to 25 percent slopes, located in a wooded area (100 yards south of the intersection of Georgia Highway No. 342 and Georgia Highway No. 52, 0.3 mile north of New Hope Church, and 50 feet west of Georgia Highway No. 342, Dawson County):

O1--1 inch to 0, partially decomposed organic matter.

A1--0 to 4 inches, strong-brown (7.5YR 5/6) sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine mica flakes; few small pores; strongly acid; gradual, wavy boundary.

A2--4 to 9 inches, yellowish-red (5YR 5/8) fine sandy loam; weak, medium, granular structure; very friable; many fine roots; few fine mica flakes; few root channels and pores; strongly acid; gradual, wavy boundary.

B1t--9 to 13 inches, yellowish-red (5YR 4/8) sandy clay loam; weak, medium and fine, subangular blocky structure; friable; few fine mica flakes; few medium roots; few medium root channels and small pores; few patchy clay films on some peds; strongly acid; gradual, wavy boundary.

B2t--13 to 23 inches, red (2.5YR 4/6) clay to clay loam; moderate, medium and fine, subangular blocky structure; friable; few fine mica flakes; few medium roots; few small root channels and small pores; many patchy clay films on most peds; strongly acid; gradual, wavy boundary.

B3t--23 to 31 inches, red (2.5YR 4/6) clay loam; moderate, fine, subangular blocky structure; friable; few mica flakes; few medium roots; few root channels and small pores; few patchy clay films on some peds; few, small, weathered rock fragments; strongly acid; gradual, wavy boundary.

C--31 to 48 inches, dark reddish-brown (2.5YR 3/4) fine sandy loam and sandy clay loam; massive; highly weathered, acidic rock materials, mainly gneiss and gneissic schist.

The Ap horizon ranges from yellowish red to dark reddish brown in color. The A1 horizon ranges from dark grayish brown to strong brown. Some areas have a B1 horizon that is sandy clay loam. The B horizon ranges from yellowish red to red in color and, in texture, from sandy clay loam in the B1t horizon to clay or clay loam in the B2t horizon, or to light clay loam in the B3t horizon. Where the soil material is weathered from rock with basic influence, the B2t horizon is darker red than typical. In the lower part of the profile, mica flakes range from few to common. The combined thickness of the A and B horizons ranges from 20 to 42 inches. Angular pebbles range from none to common on the surface and in the solum.

Hayesville sandy loam, 2 to 6 percent slopes (HIB).--The profile of this soil is similar to the one described as representative for the series. The surface layer is 5 to 10 inches thick. Depth to hard rock is generally more than 7 feet. Some areas included in mapping have a gravelly sandy loam surface layer, and a few included spots are severely eroded. In a few places the Fannin and Appling soils have been included, as well as a similar soil with a solum around 50 inches thick. This included soil is in the southern part of the survey area.

This Hayesville soil is easily worked, has a moderately deep root zone, and is suited to moderately intensive use. It is well suited to all commonly grown crops and to pine trees. Crops respond well to fertilization and good management. About half of the acreage is cultivated or pastured; the rest is wooded or idle. The hazard of erosion is slight to moderate in cultivated areas. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IIe-2; woodland group 11; wildlife group 1)

Hayesville sandy loam, 6 to 10 percent slopes (HIC).--The profile of this soil is similar to the one described as representative for the series. The surface layer is 4 to 10 inches thick. Depth to hard rock is generally more than 7 feet. Some areas mapped as this soil contain small included areas having a gravelly sandy loam surface layer. Other inclusions are eroded and have a sandy clay loam surface layer. In a few places slopes are less than 6 percent. Small areas of a similar soil that has a solum 50 inches thick and occurs in the southern part of the survey area are included with this Hayesville soil. In a few places Fannin and Rabun soils are also included.

This Hayesville soil generally is easily worked and is suitable for moderately intensive use. It is suited to all commonly grown crops (pl. III, top) and to pine trees. Crops respond well to fertilization and good management. The hazard of erosion is moderate to moderately severe in cultivated areas. About half of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IIIe-2; woodland group 11; wildlife group 1)

Hayesville sandy loam, 10 to 25 percent slopes (HIE).--The profile of this soil is the one described as representative for the series (pl. III, bottom). Depth to hard rock is generally more than 6 feet. Some areas mapped as this soil contain inclusions having a gravelly sandy loam surface layer. Other areas contain a few eroded spots where the surface layer is sandy clay loam. Also included are small areas of Fannin soils, Tallapoosa soils, and Rabun soils.

This Hayesville soil is not easily worked and has a moderately deep root zone. Because of steep slopes and a moderately severe to severe erosion hazard in cultivated areas, the soil is not suited to commonly grown cultivated crops. However, pasture and hay crops respond well to fertilization and good management. Less than one-fourth of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 11; wildlife group 2)

Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded (HJC3).--Erosion has removed most of the original surface layer of this soil, and in some places, part of the subsoil. The areas have been cut by shallow gullies and a few deep ones. The present surface layer is reddish-brown and yellowish-brown sandy clay loam about 5 inches thick. It is composed primarily of material from the subsoil but contains some of the original surface layer. The subsoil is clay or clay loam. The depth to hard rock is generally more than 6 feet.

Included in areas mapped as this soil are some small areas that have a gravelly sandy loam surface layer. In other places, small bodies of Fannin, Hayesville, and Rabun soils are included. In the southern part of the survey area, small areas of soil very similar to Hayesville soils, but with a slightly thicker solum, are included.

This Hayesville soil is fairly easily worked, but only for short periods because of the sandy clay loam surface layer that is sticky when wet and hard when dry. The hazard of further erosion is severe in cultivated areas. This soil has a moderately deep root zone and is suited to moderately intensive use. It is suited to all of the commonly grown crops, which respond well to fertilization and good management. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 14; wildlife group 3)

Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded (HJE3).--Erosion has removed most of the original surface layer of this soil and some of the subsoil in some places. The present surface layer is mainly reddish-brown sandy clay loam 3 to 6 inches thick. In most places, shallow gullies are present, along with a few deep ones. The present surface layer consists primarily of subsoil material that has been mixed with the remaining part of the original surface layer. The subsoil is mainly clay or clay loam 16 to 20 inches

thick. Depth to hard rock is generally greater than 6 feet.

This Hayesville soil is difficult to work because of steep, broken slopes and the sandy clay loam surface layer that is sticky when wet and hard when dry. The soil is not suited to very intensive use. It is better suited to commonly grown hay and pasture crops and pines. The hay and pasture crops show fair to good response to fertilization and good management. The hazard of further erosion is severe in cultivated areas. About one-third of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIe-1; woodland group 14; wildlife group 3)

Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded (HKC3).--This is an undifferentiated unit of Hayesville and Rabun soils. These soils occur on landscapes in which erosion has removed most of the original surface layer and part of the subsoil in some places. Some shallow and a few deep gullies have been formed in most areas. The present surface layer is reddish-brown to dark reddish-brown clay loam 4 to 7 inches thick. It consists primarily of subsoil material and a small amount of the original surface layer. The subsoil is red to dark-red clay loam or clay. Fine mica flakes and fractured rock occur intermittently at a depth of 31 to 60 inches. Proportions of the component soils vary, and either or both soils may be present in a particular area mapped as this unit. Generally, the Hayesville soil is dominant.

Included with these soils are areas that have a gravelly surface layer and a slightly thicker solum than the soils of this unit. Also included are small areas that have slopes of less than 6 percent.

These soils are difficult to work, except within a narrow range of moisture content, because of the clay loam surface layer that is sticky when wet and hard when dry. The hazard of further erosion is moderately severe to severe in cultivated areas. These soils are only moderately suited to intensive use. They are better suited to pasture and hay crops and to trees. About one-third of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 14; wildlife group 3)

Hayesville and Rabun loams, 6 to 10 percent slopes (HLC).--These soils occur as an undifferentiated unit that is about 45 percent Hayesville loam and 30 percent Rabun loam. However, these proportions vary from one mapped area to another and either soil may be absent within a particular area. In these soils the surface layer ranges from 6 to 10 inches in thickness but is generally about 8 inches thick. The subsoil generally is 18 to 24 inches thick. In some places dykes of weathered basic schist occur intermittently at depths of 18 to 36 inches. Depth to hard rock is generally more than 5 feet. Small included areas have a few angular quartz and gneiss pebbles on the surface. Also included are small areas of Hiwassee soils and a few areas where slopes are less than 6 percent.

The Hayesville and Rabun soils are easily worked and have a moderately deep root zone. These soils are well suited to moderately intensive use. They are suited to most commonly grown crops and pine trees. Crops respond well to fertilization and good management. The hazard of erosion is moderate to moderately severe in cultivated areas. About half of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IIIe-2; woodland group 9; wildlife group 1)

Hayesville and Rabun loams, 10 to 15 percent slopes (HLD).--These soils were mapped as an undifferentiated unit that is about 40 percent Hayesville loam and 30 percent Rabun loam. However, these proportions vary from one mapped area to another, and either soil may be absent within a given area. In these soils the surface layer ranges from about 5 to 9 inches in thickness. The subsoil generally is 16 to 24 inches thick. Weathered hornblende gneiss fragments occur sporadically in the lower subsoil and in the underlying material in places.

A few angular quartz and gneiss pebbles occur on the surface in a few places. Small areas having an eroded surface layer are included, along with a few rock outcrops where these soils are near Musella and Tallapoosa soils. In some places slope is less than 10 percent, and in others, slightly more than 15 percent.

These Hayesville and Rabun soils are easily worked and have a moderately deep to deep root zone. The soils are moderately well suited to intensive use. They are suited to most commonly grown crops and pine trees. Crops respond well to fertilization and good management. The hazard of erosion is moderately severe to severe in cultivated areas. About one-third of the acreage is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 9; wildlife group 2)

Hayesville and Rabun loams, 25 to 60 percent slopes (HLF).--These soils occur in small areas in the mountains. The unit is about 40 percent Hayesville soil and 25 percent Rabun soil. These proportions vary from one mapped area to another, however, and either soil may be absent within a particular area.

In these soils the surface layer ranges from 2 to 6 inches in thickness. For the most part, the surface layer is not eroded, but a few eroded spots are included in a few places. The subsoil ranges from 15 to 22 inches in thickness. Narrow dykes of weathered hornblende gneiss and basic schist occur in the lower subsoil and underlying material. Also included with these soils are small areas that have angular quartz and gneiss gravel and a few cobblestones in the surface layer, as well as a few rock outcrops.

These soils are not suited to intensive use. Because of the steep slopes and the erosion hazard, which is severe in cultivated areas, the soils are better suited to commonly grown trees. Most of the acreage has remained in woods, and most of the previously cleared areas have been reforested, chiefly to shortleaf and Virginia pines. (Capability unit VIIe-1; woodland group 9; wildlife group 4)

Hiwassee Series

The Hiwassee series consists of deep, gently sloping to steep, well-drained soils that formed in old alluvium and colluvium. This material was derived from weathered, basic and acid metamorphic rock, such as hornblende gneiss, diorite, and hornblend schist. These soils occur in small areas on old stream terraces, on foot slopes, in saddles, and around drainage heads along many of the larger streams. Large areas are in central Lumpkin County, and many small areas are scattered throughout the southern three-fourths of Dawson and White Counties.

Typically, in the less eroded areas, the surface layer is dark reddish-brown loam about 7 inches thick. The subsoil, to a depth of about 55 inches, is mainly dark-red clay to clay loam. Few to many, rounded and angular pebbles are on the surface and scattered throughout the profile in many places. Few to common mica flakes occur in the profile in many places. Depth to hard rock is generally more than 8 feet.

Permeability of these soils is moderate. They are medium to low in natural fertility, low in organic content, medium in available water capacity, and strongly acid. They have a deep root zone. Field observations show that these soils warm 15 to 20 days earlier in the spring than the grayer soils.

Hiwassee soils occur with Rabun, Hayesville, and Fannin soils in the uplands and with Wickham soils in old colluvial-alluvial areas. Hiwassee soils have a thicker solum than the Rabun soils. They have a darker red and thicker solum than the Hayesville and Fannin soils, and they contain less mica in the solum than the Fannin soils. Hiwassee soils have a darker red, more clayey subsoil than the Wickham soils.

Hiwassee soils are well suited to farming, and about two-thirds of the acreage on the more gentle slopes is cultivated or used for pasture. The rest is idle or in woods. In natural wooded areas the chief trees are oak, hickory, yellow-poplar, black locust, and pine. The reforested areas are mainly in shortleaf and Virginia pines, along with some hardwoods.

Representative profile of Hiwassee loam, 2 to 10 percent slopes (5.1 miles west of Dahlonega, 0.6 mile south of Georgia Highway No. 52, 50 feet west of dirt road and 0.3 mile north of Tobacco Pouch Branch, Lumpkin County):

Ap--0 to 7 inches, dark reddish-brown (5YR 3/2) loam; weak, fine, granular structure; very friable; many fine roots and small pores; strongly acid; clear, wavy boundary.

B1t--7 to 14 inches, red (2.5YR 4/6) sandy clay loam; weak, fine, subangular blocky structure; friable; few patchy clay films on some peds; few fine mica flakes; many fine roots; many small pores; strongly acid; gradual, wavy boundary.

B21t--14 to 31 inches, dark-red (10R 3/6) clay loam to clay; moderate; medium, subangular blocky structure; friable; many patchy clay films on some peds; few fine mica flakes; many small pores; few, small, rounded pebbles; strongly acid; gradual, diffuse boundary.

B22t--31 to 38 inches, dark-red (10R 3/6) clay loam to clay; moderate, medium, subangular blocky structure; friable; patchy clay films on most peds; few fine mica flakes; few small pores; few, small, rounded pebbles; strongly acid; gradual, diffuse boundary.

B3t--38 to 55 inches, red (2.5YR 4/6) clay loam; few, fine, distinct, reddish-yellow (7.5YR 6/6) mottles; moderate, medium, subangular blocky structure; friable; few patchy clay films on some peds; few fine mica flakes; few, small, rounded pebbles; strongly acid; gradual, wavy boundary.

C1--55 to 67 inches, red (10R 4/6) sandy clay loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; massive; very friable; about 35 percent, by volume, of medium to coarse, rounded gravel; strongly acid; clear, smooth boundary.

IIC2--67 to 72 inches, red (10R 4/6) light clay loam; massive; very friable; highly weathered residual gneiss and schist material.

The A horizon is mainly dark reddish brown in color and ranges from loam to fine sandy loam, except in eroded areas where it is dark-red to dusky-red clay loam. The A horizon ranges from 2 to 10 inches in thickness. The B2 horizons range from clay loam to clay. The B3t horizon is generally 1 to 2 hues lighter than the B2t horizons, and in places it contains few to common fine mica flakes, black concretions, and few to common quartz pebbles. The combined thickness of the A and B horizons ranges from 4 to 10 feet.

Hiwassee loam, 2 to 10 percent slopes (HSC).--This soil has the profile described as representative for the series. The surface layer is 4 to 10 inches thick. Depth to hard rock is generally more than 8 feet. Some areas contain inclusions in which the surface layer is gravelly fine sandy loam or gravelly sandy loam. Other areas contain a few eroded spots where the plow layer is clay loam. In a few places small areas of Masada and Wickham soils have been included.

This Hiwassee soil is easily worked and is suited to moderately intensive use. It is adapted to all commonly grown crops (pl. IV, top) and to pine trees. Crops respond well to fertilization and good management. The hazard of erosion is slight to moderately severe in cultivated areas. Most of the acreage was used for crops and pasture at one time. Now, about two-thirds of it is cultivated or pastured; the rest is wooded or idle. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit IIIe-1; woodland group 8; wildlife group 1)

Hiwassee loam, 10 to 15 percent slopes (HSD).--The plow layer of this soil is 4 to 8 inches thick. Depth to hard rock is more than 10 feet. Included in mapping are small areas where the surface layer is fine sandy loam or gravelly fine sandy loam. Other areas contain few eroded spots having a clay loam plow layer. Small areas of Wickham and Masada soils are also included in places.

This Hiwassee soil is easily worked and is suited to moderately intensive use. It is suited to all commonly grown crops and to pine trees. Crops respond well to fertilization and good management.

The hazard of erosion is moderately severe to severe in cultivated areas. Most of the acreage was used for crops and pasture at one time. About one-half of the acreage is cultivated or pastured; the rest is wooded or idle. The reforested areas are mainly in shortleaf and Virginia pines. (Capability unit IVe-1; woodland group 8; wildlife group 2)

Hiwassee loam, 15 to 40 percent slopes (HSF).--The plow layer of this soil is 3 to 8 inches thick. This layer generally is thicker on the lower edges of the slopes than it is in other places. Some areas mapped as this soil contain small inclusions having a gravelly and cobbly fine sandy loam surface layer, and small areas having a clay loam plow layer. In addition, on the upper slopes, adjacent to residual soils that have a high mica content, the subsoil is thinner and coarser textured than typical. Also included are some areas of Fannin, Wickham, and Rabun soils.

This Hiwassee soil is difficult to work because of steep slopes. It is moderately well suited to all commonly grown pasture and hay crops, which respond well to fertilization and good management.

The hazard of erosion is severe to very severe in cultivated areas. About half of the acreage was used for crops and pasture at one time. Less than one-fourth of the acreage is cultivated or pastured; the rest is wooded or idle. The reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIIe-1; woodland group 8; wildlife group 4)

Masada Series

The Masada series consists of deep, well-drained soils that developed in old alluvium washed from soils derived from weathered igneous and metamorphic rock, such as granite, gneiss and schist. These soils occur in small to medium-sized areas on old stream terraces. Slopes are moderately long. The soils are located along the larger streams above the flood plains.

Typically, the surface layer is dark-brown fine sandy loam about 6 inches thick. The subsoil, to a depth of 43 inches, is strong brown in the upper part to yellowish brown in the lower part, and it is mainly sandy clay loam. The lower part of the subsoil generally has few to common yellowish-brown to yellowish-red mottles. Between depths of about 43 and 60 inches is strong-brown fine sandy loam mottled with reddish yellow. Few to many rounded pebbles are on the surface and occur in narrow bands throughout the profile in some places. Few to common mica flakes occur throughout the surface layer and subsoil. Depth to hard rock is more than 8 feet.

These soils are low in natural fertility and organic-matter content. They are strongly acid throughout the profile. Permeability is moderate, and the available water capacity is medium. The root zone is deep.

Masada soils commonly occur with Starr, Congaree, Wickham, and Augusta soils. They occur on higher positions than the Starr and Congaree soils, and, unlike those soils, they have a Bt horizon. Wickham soils have a thicker solum than the Masada soils. Masada soils are better drained than the somewhat poorly drained Augusta soils.

Masada soils are well suited to farming, and about two-thirds of the acreage is cultivated or used for pasture. These soils are not important to farming, because of their small acreage. From field observations, Masada soils warm 2 to 3 weeks later than the redder soils. In wooded areas the chief trees are oak, hickory, black walnut, dogwood, and maple, along with some shortleaf and Virginia pines.

Representative profile of Masada fine sandy loam, 2 to 6 percent slopes, in an idle field (0.6 mile west of U.S. Highway No. 19, 0.3 mile north of Etowah River, and 0.6 mile northeast of Nuclear Laboratory Headquarters, Dawson County):

Ap--0 to 6 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine mica flakes; few, small, rounded pebbles; strongly acid; clear, smooth boundary.

B1t--6 to 14 inches, strong-brown (7.5YR 5/6) sandy clay loam; moderate, fine, granular structure; friable; many fine roots; few fine mica flakes; strongly acid; clear, smooth boundary.

B21t--14 to 20 inches, strong-brown (7.5YR 5/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; few fine roots; few fine mica flakes; few small pores; few patchy clay films; strongly acid; clear, smooth boundary.

B22t--20 to 29 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, faint, yellowish-brown (10YR 5/6) mottles; moderate, medium, subangular blocky structure; friable; thin clay films on many peds; few fine mica flakes; strongly acid; clear, smooth boundary.

B3t--29 to 43 inches, yellowish-brown (10YR 5/8) light sandy clay loam; common, fine, distinct, yellowish-red (5YR 5/8) mottles; moderate, medium, subangular blocky structure; friable; thin clay films on many peds; many fine mica flakes; few medium roots; few small pores; strongly acid; clear, smooth boundary.

C--43 to 60 inches, strong-brown (7.5YR 5/8) fine sandy loam; common, fine, distinct, reddish-yellow (7.5YR 6/6) mottles; massive; very friable; many fine mica flakes; strongly acid.

The Ap horizon ranges from dark brown to dark grayish brown in color and from 3 to 15 inches in thickness. A few rounded pebbles are on the surface in some areas. Some small areas have a loam A horizon. Some areas have an A2 horizon that is dark grayish brown. The B1 horizon ranges from strong brown to yellowish red. The B2t horizons range from yellowish brown to yellowish red in color and from fine sandy clay loam to sandy clay loam in texture. A few mottles commonly occur in the lower part, along with a few soft concretions. The combined thickness of the A and B horizons ranges from 40 to 60 inches but in most places is less than 50 inches. The C horizon consists of layers of rounded gravel or residual material weathered from gneiss, schist, or a mixture of both.

Masada fine sandy loam, 2 to 6 percent slopes (MoB).--The profile of this soil is the one described as typical for the series. In this soil the surface layer ranges from 6 to 15 inches in thickness but generally is about 8 inches thick. Fine mica flakes and rounded pebbles range from few to common in the profile in some places. Depth to hard rock is generally more than 8 feet.

Included with this soil are small areas that are nearly level, as well as some areas of Starr, Augusta, and Congaree soils.

This soil is easily worked and is suited to a moderately intensive use. It is suited to all commonly grown crops, hardwoods, and pine trees. The crops respond well to fertilization and good management.

The hazard of erosion is slight to moderate in cultivated areas. About three-fourths of the acreage is cultivated or pastured; the rest is wooded or idle. The reforested areas are mainly in hardwoods and shortleaf and Virginia pines. (Capability unit IIe-2; woodland group 3; wildlife group 1)

Masada fine sandy loam, 2 to 6 percent slopes, eroded (MoB2).--This soil has been eroded to the extent that tillage implements have reached through the remaining surface layer and mixed it with the upper part of the subsoil. Scattered infrequently over most fields are small areas where the strong-brown or yellowish-brown sandy clay loam subsoil is exposed. The present surface layer is 4 to 7 inches thick. Otherwise, the profile of this soil is similar to the profile described for the series. Fine mica flakes and pebbles range from few to common within the profile. Included with this soil are small areas of Starr and Wickham soils.

This soil is easily worked and is suitable for moderately intensive use. It is suited to all commonly grown crops, hardwoods, and pine trees. Crops respond well to fertilization and good management.

The hazard of further erosion is moderate to moderately severe in cultivated areas. Approximately two-thirds of the acreage of this soil is cultivated or pastured; the rest is idle or wooded. The reforested areas are mainly in hardwoods and shortleaf and Virginia pines. (Capability unit IIe-2; woodland group 3; wildlife group 1)

Masada fine sandy loam, 6 to 10 percent slopes, eroded (MoC2).--Erosion has removed part of the original surface layer of this soil, and tillage implements have reached through the remaining surface layer and mixed it with subsoil material. Scattered infrequently throughout the mapped areas are places where the strong-brown or yellowish-brown sandy clay loam subsoil is exposed. The present surface layer ranges between 3 and 7 inches in thickness. Few shallow rills and gullies have been formed in some fields. Otherwise, this soil is similar to the one described for the series. Small areas having slopes slightly steeper than 10 percent are included, as well as small areas of Wickham soils.

Generally, this soil is easily worked. It is suited to all commonly grown crops, hardwoods, and pine trees. Crops respond well to fertilization and good management.

The hazard of further erosion is moderately severe in cultivated areas. About two-thirds of the acreage is cultivated or pastured; the rest is wooded or idle. The reforested areas are mainly in hardwoods and Virginia and shortleaf pines. (Capability unit IIIe-2; woodland group 3; wildlife group 1)

Masada fine sandy loam, 10 to 15 percent slopes, eroded (MoD2).--Erosion has removed much of the original surface layer from this soil. In areas that were cultivated, tillage implements have reached through the surface layer and mixed it with some of the subsoil. Scattered sporadically over most fields are small areas where the strong-brown sandy clay loam subsoil is exposed. The present surface layer is 3 to 7 inches thick. A few shallow gullies and rills are present in most areas. Near the bases of slopes, a few light-gray mottles occur in the lower part of the subsoil. Otherwise, this soil is very similar to the one described for the series.

Small areas of Wickham and Hiwassee soils are included in some areas. Here, the soils are more than 50 inches deep. Depth to hard rock is generally more than 8 feet.

This Masada soil is easily worked. It is suited to all commonly grown crops and to pine trees. Crops respond well to fertilization and good management. Nevertheless, the hazard of further erosion is severe in cultivated areas. Most of this soil was cultivated or pastured at one time. Now, about half of the acreage is cultivated or pastured; the rest is idle or wooded. The reforested areas are mainly in hardwoods and shortleaf and Virginia pines. (Capability unit IVe-1; woodland group 3; wildlife group 2)

Musella Series

The Musella series consists chiefly of moderately deep, well-drained soils on uplands. These soils have formed in materials weathered from diorite, schist, and hornblende gneiss. They occur in small to medium-sized areas. Slopes range from 6 to 70

percent. The largest areas are in the central part of Lumpkin County, and small areas are scattered throughout the southern three-fourths of the survey area.

Typically, the surface layer is dark reddish-brown gravelly clay loam, about 4 inches thick, that contains varying amounts of cobblestones and gravel. The subsoil, to a depth of about 19 inches, is dark-red gravelly clay loam. Between depths of about 19 inches and 48 inches is dark-red gravelly clay loam. Few to many angular pebbles and cobblestones are on the surface and scattered throughout the profile in many places. Depth to weathered rock is generally about 48 inches.

Permeability is moderate. The soils are low in natural fertility and organic-matter content. They are strongly acid throughout the profile. The available water capacity is generally low. The Musella soils have a shallow or moderately shallow root zone.

Musella soils commonly occur with Rabun, Hiwassee, Fannin, and Tallapoosa soils. They have a thinner B horizon that contains more fragments of parent rock than the Rabun and Hiwassee soils. Musella soils have a thinner, darker red B horizon containing less mica than the Fannin soils. They have a darker red, more clayey B horizon than the Tallapoosa soils.

Suitability of Musella soils for farming is limited because of depth of the effective rooting zone and a cobbly surface layer. Only a small acreage, located in the more gently sloping areas, is cultivated or is used for pasture. The rest is idle or wooded. In the natural wooded areas, the chief trees are oak, hickory, and yellow-poplar, as well as Virginia and shortleaf pines. About one-third of the acreage on the more gentle slopes has been cleared and cultivated or pastured. Most of the acreage has been reforested, mainly to Virginia and shortleaf pines.

Representative profile of Musella gravelly clay loam, 10 to 25 percent slopes, eroded, in an idle field (0.3 mile northwest of Auraria Methodist Church, and 0.2 mile north of Georgia Highway No. 9E, Lumpkin County):

Ap--0 to 4 inches, dark reddish-brown (5YR 3/2) gravelly clay loam; weak, fine, granular structure; very friable; few fine mica flakes; many small roots; common small rock fragments; strongly acid; gradual, wavy boundary.

B2t--4 to 14 inches, dark-red (2.5YR 3/6) gravelly clay loam; moderate, medium, subangular blocky structure; friable; few small black concretions; clay films common on many peds; few fine roots; few small rock fragments; few small pores and root channels; strongly acid; gradual, wavy boundary.

B3t--14 to 19 inches, dark-red (2.5YR 3/6) gravelly clay loam; narrow lenses of weak-red (2.5YR 4/2) and yellowish-red (5YR 4/8) weathered rock fragments and mica flakes; moderate, medium, subangular blocky structure; friable; few clay films on some peds; few small pores and root channels; strongly acid; gradual, wavy boundary.

C--19 to 48 inches, dark-red (2.5YR 3/6) gravelly clay loam; many weak-red (2.5YR 4/2) and yellowish-red (5YR 4/8) rock and schist fragments; few, fine, soft, black concretions; massive; very friable; few small pores and root channels; strongly acid.

R--48 inches +, partially weathered basic gneiss and schist.

The A horizon ranges from dark reddish-brown loam in areas that have remained in woods to reddish-brown clay loam in some eroded cultivated areas. Rock fragments and pebbles range from few to common on the surface. The B2t horizon ranges from dark red to red. Its texture is mainly clay loam, but there is an occasional lens of clay. Generally, the B horizon contains few to common rock and schist fragments and black concretions. Thickness of the solum ranges mainly from 12 to 20 inches but is thicker where tongues of the Bt horizons reach down between the broken rock fragments. Mica flakes are common in areas that are near soils formed in material weathered from schist. Broken and soft rock that underlies these soils is several feet thick in many places.

Musella cobbly loam, 6 to 25 percent slopes (MCE).--The surface layer of this soil is dark reddish-brown loam 4 to 7 inches thick. Cobblestones are few to common on the surface. The subsoil is clay loam 10 to 20 inches thick. Depth to hard rock is more than 4 feet in most places. Small eroded patches having a clay loam plow layer are included in some areas. Also included are small areas of rock outcrops and of Rabun, Tallapoosa, and Hiwassee soils.

This Musella soil is difficult to work and is not suited to intensive use, because of cobblestones on the surface and rock outcrops. Small areas that are less cobbly are suited to locally grown grasses and pine trees. Crop response is fair to fertilization and good management.

The erosion hazard is moderate to severe in cultivated areas. Less than one-tenth of the acreage is used for crops and pasture; the rest is idle or wooded. Most of the acreage has remained in trees. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIIe-2; woodland group 10; wildlife group 5)

Musella cobbly loam, 25 to 70 percent slopes (MCG).--The surface layer of this soil is dark reddish-brown loam in which cobblestones and gravel are common. Thickness ranges from 2 to 4 inches, but generally it is 3 inches. The subsoil is clay loam, 4 to 18 inches thick. Depth to hard rock is more than 3 feet in most places. Rock outcrops range from few to common in most areas.

Small areas are included in some places where slopes are slightly less than 25 percent. In the small areas where escarpments are included, the

slopes are slightly more than 70 percent. Also included are small areas of a Rabun soil that has a thicker solum than this Musella soil, and small areas of Rock land.

This Musella soil is not suited to intensive use, because it is cobbly and steep, and it contains rock outcrops. It is only suited to trees. Most of the acreage has remained in trees and wildlife habitat. (Capability unit VIIe-2; woodland group 10; wildlife group 5)

Musella gravelly clay loam, 10 to 25 percent slopes, eroded (MuE2).--This soil has been eroded to the extent that tillage implements have reached through the remaining surface layer and into the clay loam subsoil. For the most part, the surface layer is a mixture of the upper part of the subsoil with remnants of the surface layer. Small areas of exposed dark-red subsoil are in most fields. The profile of this soil is the one described for the series.

Included with this soil are small, severely eroded spots that are dark-red clay. A few rock fragments and cobblestones are on the surface in some places. Other inclusions are small areas of Hiwassee and Rabun soils. Here, the soil is about 40 inches thick.

This Musella soil is difficult to work. It is not suited to intensive use, because of its droughtiness and clay loam surface layer. It is suited to commonly grown grasses and pine trees. The grasses show fair response to fertilization and good management.

The hazard of further erosion is moderate to severe in cultivated areas. Only a small acreage is used for crops and pasture. The rest is idle or wooded. Most of the acreage has remained in trees. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIe-4; woodland group 14; wildlife group 5)

Porters Series

The Porters series consists of moderately deep, well-drained soils that formed in materials weathered from granite and biotite gneiss that contain narrow dykes of schist in places. These soils occur in medium-sized to large areas on mountaintops and very steep side slopes. They are scattered throughout the northern one-fourth of the survey area and the southwestern corner of Dawson County.

Typically, the surface layer is very dark grayish-brown and very dark brown loam about 6 inches thick. The subsoil is chiefly dark-brown clay loam about 16 inches thick. Between depths of 22 inches and 48 inches is yellowish-brown fine sandy loam and loam and very dark gray rock fragments. Depth to hard rock is more than 4 feet.

These soils are low in natural fertility, are low to medium in organic-matter content, and have mainly a moderately shallow root zone. Permeability is moderately rapid. Reaction is strongly acid to slightly acid. The available water capacity of these soils is low. On tops of narrow ridges and upper slopes, these soils are droughty, but they are less droughty near the foot of the slopes.

Porters soils commonly occur with Ashe, Tusquitee, Edneyville, and Burton soils. They have a Bt horizon, but the Ashe and Burton soils do not. Porters soils are not so deep as Edneyville or Tusquitee soils, and they are not so clayey as Hayesville soils.

Porters soils are not suited to farming, and only a small acreage has been cleared and used for cultivation or pasture. The wooded areas are mainly in oaks, hickory, maple, birch, sourwood, and pitch and white pines. Generally, the understory is laurel and rhododendron. Only a small acreage on the more gentle slopes has been cleared and used for crops and pasture. However, most of this acreage has been reforested, mainly to hardwoods but also to a few pines. These soils occur only in undifferentiated units with the Edneyville soils.

Representative profile of a Porters loam having slopes of 10 to 15 percent (in woods 50 yards east of Winding Stair Gap, Lumpkin County):

O--2 inches to 0, layer of decomposed leaves and twigs.

A1--0 to 2 inches, very dark grayish-brown (10YR 3/2) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few angular rock fragments on surface; strongly acid; clear, smooth boundary.

A2--2 to 6 inches, very dark brown (10YR 2/2) loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small pores and root channels; strongly acid; gradual, smooth boundary.

B2t--6 to 22 inches, dark-brown (7.5YR 4/4) clay loam; dark-gray (N 4/0) rock fragments; weak, coarse, subangular blocky structure that breaks to moderate, fine, granular structure; friable; few fine mica flakes; few medium roots; many small pores and root channels; strongly acid; gradual, smooth boundary.

BC--22 to 48 inches, yellowish-brown (10YR 5/4) fine sandy loam and loam; very dark gray (N 3/0) rock fragments; massive; very friable; many fine mica flakes and sand grains; few medium roots; stones extend into the soil from below at depths between 24 and 28 inches; this transitional layer tongues into the C horizon to a depth of as much as 48 inches; 20 percent rocks; slightly acid; abrupt, clear boundary.

C--48 inches +, soft micaceous loamy saprolite; some feldspar and black streaks in weathered schist; 50 percent rock fragments; rock extends to within 24 to 28 inches of the surface but tongues of soft material extend downward in the rock to a depth of 48 inches or more.

The A horizon is mainly dark grayish-brown to very dark grayish-brown loam and gravelly loam 4 to 8 inches thick. In some areas the texture of the A horizon is gravelly fine sandy loam. The B2t horizon is dark-brown to brown loam to clay loam.

Rock fragments in the solum range from few to common in many places. The thickness of the solum mainly ranges from 20 to 30 inches but is generally less than 30 inches. In some places narrow tongues of material from the B horizon extend to a depth of 60 inches in the rock material.

Rabun Series

The Rabun series consists mainly of moderately deep to deep, well-drained soils on narrow to moderately wide ridgetops and hillsides. These soils formed in materials weathered from hornblende gneiss, diorite, hornblende schist, and gneiss. The slopes range from 10 to 25 percent. The largest areas are in the east-central part of Lumpkin County, but small areas are scattered throughout the southern three-fourths of the survey area.

These soils typically have a surface layer of dark reddish-brown clay loam about 6 inches thick. The subsoil is mainly dark-red clay loam about 32 inches thick. Below a depth of about 38 inches is yellowish-red loam and rock fragments. Depth to hard rock is more than 5 feet.

These soils are moderate to moderately low in natural fertility and low in organic-matter content. They are medium acid to strongly acid throughout the profile. Permeability is moderate, and the available water capacity is medium. The root zone is moderately deep to deep.

Rabun soils occur in small to medium-sized areas with Musella, Hiwassee, Fannin, and Hayesville soils. Rabun soils have a thicker solum than the Musella soils, have a darker red B horizon than the Hayesville soils, and are darker red but contain less mica than the Fannin soils. Rabun soils have a thinner solum than Hiwassee soils.

The less sloping Rabun soils are well suited to farming, and about one-third of this acreage is cultivated or pastured. The chief trees in the wooded areas are hickory, oaks, yellow-poplar, maple, and shortleaf pine. The reforested areas are chiefly in Virginia and shortleaf pines. Most of the steeper areas have remained in a mixture of hardwoods and some pine. Rabun soils in this survey area occur separately and in undifferentiated units with the Hayesville soils.

Representative profile of Rabun clay loam, 10 to 15 percent slopes, severely eroded (1.2 miles west of Cavenders Creek Church; 1.7 miles east of U.S. Highway No. 19, and 4.5 miles along U.S. Highway No. 19 from Dahlonega City Square, Lumpkin County):

Ap--0 to 6 inches, dark reddish-brown (2.5YR 3/4) clay loam; moderate, fine to medium, granular structure; friable; many small roots; 10 percent angular gravel; strongly acid; abrupt, wavy boundary.

B21t--6 to 20 inches, dark-red (10R 3/6) clay; moderate, medium and fine, subangular blocky structure; friable to firm; patchy clay films on the surface of some peds; few fine mica flakes; 10 to 15 percent gravel; few cobblestones of hornblende gneiss; strongly acid; gradual, wavy boundary.

B22t--20 to 31 inches, dark-red (2.5YR 3/6) clay; weak, medium and fine, subangular blocky structure; firm; many clay films on peds; few fine mica flakes; strongly acid; irregular boundary.

BC--31 to 38 inches, dark-red (2.5YR 3/6) clay loam; massive; very friable; fine mica flakes common; many small black specks; intermittent fractured hornblende gneiss at a depth of 33 inches; strongly acid; irregular boundary.

C--38 to 60 inches +, yellowish-red (5YR 4/8) loam; massive; very friable; 50 to 60 percent hornblende gneiss fragments; many fine mica flakes; many fine black specks; strongly acid.

Texture of the A horizon ranges from loam in the slightly eroded areas to clay loam in the eroded areas. In areas that have remained in woods, the A1 horizon is dark-brown or dark reddish-brown loam, but in severely eroded areas the Ap horizon is dark reddish-brown to reddish-brown clay loam. The range in the thickness of the A horizon is 4 to 8 inches. The Bt horizons are dark red to red and range from clay to clay loam. The lower part of the B22t horizon is generally 1 or 2 hues lighter red and may contain a few faint mottles.

Narrow tongues of material from the B horizon may extend between rocks to a depth of more than 4 feet. Depth to bedrock ranges from 3 to 8 feet. Small areas may contain pebbles where these soils occur near Musella soils and where narrow dykes of quartzite are in the parent material.

Rabun loam, 15 to 25 percent slopes (RaE).--The profile of this soil is similar to the one described for the series, except that the surface layer is reddish-brown to dark-brown loam about 5 to 8 inches thick (pl. IV, bottom left). Narrow quartz dykes occur in the lower part of the subsoil and in the underlying material at intervals of about 4 to 25 feet in some places.

In some places small areas are included in which angular quartz and gneiss gravel and a few cobblestones occur in the profile. A few small areas also include eroded spots where the plow layer is clay loam.

Included in mapping are small areas of a similar soil that has a solum ranging from 38 to 48 inches in thickness. This soil generally occurs in the southern part of the survey area. Other inclusions are small areas of Hiwassee and Musella soils.

This soil is not suited to intensive use, because of slope. It is moderately well suited to all commonly grown grasses and pine trees. The grasses respond well to fertilization and good management.

The hazard of erosion is moderately severe to severe in cultivated areas. Many areas have been cultivated or used for pasture at one time. Only a small acreage of this soil is cultivated or pastured; the rest is idle or wooded. Reforested areas

are mainly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 9; wildlife group 4)

Rabun clay loam, 10 to 15 percent slopes, severely eroded (RbD3).--This soil has the profile described as typical for the series. The soil has been eroded to the extent that practically all of the original surface layer has been removed. The present surface layer is a mixture of the upper part of the clayey subsoil and remnants of the original surface layer. Shallow gullies are common, and occasionally there is a deep one.

Included are small areas that have a gravelly surface layer. In the southern part of the survey area, a similar soil has been included that has a solum slightly more than 40 inches thick.

This Rabun soil is difficult to work because of its clay loam surface layer that is sticky when wet and hard when dry. The soil is not well suited to intensive use; it is better suited to commonly grown hay and pasture crops and to pine trees. The pasture and hay crops show fair to good response to fertilization and good management.

The hazard of further erosion is severe in cultivated areas. Only a small acreage is cultivated or pastured; the rest is idle or wooded. All of this acreage was cultivated or pastured at one time. The reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIe-1; woodland group 14; wildlife group 3)

Rabun clay loam, 15 to 25 percent slopes, severely eroded (RbE3).--This soil occurs mainly in previously cultivated fields. It has been eroded to the extent that the present surface layer is a mixture of the clayey subsoil and remnants of the original surface layer. Many areas contain shallow gullies or an occasional deep one. These gullies expose the dark-red clay subsoil.

In the southern part of the survey area, small areas of a soil with a solum thicker than 40 inches are included. Elsewhere, a few rock outcrops and rock fragments have been included, especially where this soil is near Musella soils.

This soil is difficult to work because of steep, broken slopes and a clay loam surface layer that is sticky when wet and hard when dry. This soil is not suited to intensive use. It is suited to commonly grown pasture crops and pine trees. The pasture crops show fair to moderately good response to fertiliaation and good management.

The hazard of further erosion is severe to very severe in cultivated or barren areas. Only a small acreage is cultivated or pastured; the rest is idle or wooded. The reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIe-1; woodland group 14; wildlife group 3)

Rock Land

Rock land (Roc) is a miscellaneous land type that occupies small areas throughout the mountainous part of the survey area (pl. IV, bottom right). Generally, it consists of outcrops of gneiss or granite gneiss which occur above the surface or within a few inches of the surface. Small pockets of medium-textured and coarse-textured material that shows little soil development occurs over 20 to 35 percent of the acreage. Some of the pockets have accumulated 1 inch to 6 inches of organic matter. The slope ranges from 15 to 90 percent.

Generally, Rock land does not support vegetation. However, a few scrubby trees, shrubs, mosses, lichens, and grasses have survived for years in small pockets of soil material or in crevices in the rocks. This land type can be developed to a limited extent for recreational use and to provide a little food and cover for wildlife. Where it is accessible, the rock can be quarried, crushed, and used for road material. (Capability unit VIIIs-1; not classified into a woodland group or wildlife group)

Starr Series

The Starr series consists of deep, nearly level to very gently sloping, well-drained soils. These soils formed on low stream terraces, on foot slopes, and in slight depressions. Individual areas range in size from 2 to 8 acres.

Typically, these soils have a surface layer of dark yellowish-brown fine sandy loam about 6 inches thick. The subsurface layer is dark-brown loam about 6 inches thick. The subsoil is mainly brown, strong-brown, and yellowish-brown sandy clay loam and clay loam about 35 inches thick. Below this, to a depth of 60 inches, is yellowish-brown fine sandy loam. Depth to hard rock is 8 feet or more.

The natural fertility and content of organic matter in these soils are low to medium. The reaction is strongly acid. Permeability is moderately rapid, the available water capacity is high, and the root zone is deep.

The Starr soils occur mainly with the Congaree, Cartecay, Toccoa, and Wehadkee soils, but they occupy slightly higher positions than those soils. They have a B horizon, but the Congaree soils do not, and they are better drained and finer textured than Cartecay and Toccoa soils. In this survey area, the Starr soils were mapped alone and in an undifferentiated unit with the Congaree soils. For a description of this unit, see the Congaree series.

Starr soils can be cultivated intensively and are suited to most crops grown in the survey area. The crops respond well to fertilization and good management. About 85 percent of the acreage is pastured or cultivated; the rest is idle or wooded. The chief trees are water-tolerant hardwoods, such as oaks, as well as hickory, yellow-poplar, gum, maple, and a few pines.

Representative profile of Starr fine sandy loam (0.6 mile west of U.S. Highway No. 19, 150 yards north of Etowah River, and 0.7 mile east of Nuclear Laboratory, Dawson County):

Ap--0 to 6 inches, dark yellowish-brown (10YR 3/4) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; strongly acid; clear, smooth boundary.

A3--6 to 12 inches, dark-brown (7.5YR 4/4) loam; moderate, fine, granular structure; friable; many fine mica flakes; many fine roots; few small root channels; strongly acid; clear, smooth boundary.

B1--12 to 15 inches, brown (7.5YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; many fine roots; few small pores and root channels; strongly acid; clear, smooth boundary.

B21--15 to 18 inches, strong-brown (7.5YR 5/6) sandy clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; many fine roots; few small pores and root channels; strongly acid; clear, smooth boundary.

B22--18 to 28 inches, strong-brown (7.5YR 5/6) clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; few fine roots; few small pores and root channels; strongly acid; clear, smooth boundary.

B3--28 to 47 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, fine, distinct, strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; very friable; few fine mica flakes; few fine roots; few small pores and root channels; strongly acid; clear, smooth boundary.

C--47 to 60 inches +, yellowish-brown (10YR 5/6) fine sandy loam; few, fine, distinct, yellowish-brown (10YR 5/8) and pale-brown (10YR 6/3) mottles; massive; very friable; many fine mica flakes; few fine roots; strongly acid.

The surface layer is mainly dark yellowish-brown to brown fine sandy loam to loam, 5 to 10 inches thick, but in some areas the texture is silt loam. The B2 horizon ranges from loam to silty clay loam in the upper part to clay loam or sandy clay loam in the lower part. In some areas the B3 horizon is mottled with strong brown or yellowish brown. The solum ranges from 40 to 60 inches in thickness, but in most places it is about 50 inches thick. Depth to hard rock is more than 8 feet.

Starr fine sandy loam (0 to 4 percent slopes) (Sta).--This soil occurs in small areas on low stream terraces. It is subject to brief flooding during some winter months. The plow layer is 5 to 18 inches thick. In a few places small areas of Congaree soils are included, and in other areas small areas of Cartecay soils are included.

This Starr soil is easily worked and is suited to very intensive use. It is suited to all commonly grown crops, hardwoods, and pine trees. Crops respond well to fertilization and good management.

The hazard of erosion is slight in cultivated areas. Most of the acreage of this soil was used for crops and pasture at one time. More than three-fourths of the acreage is now cultivated or pastured; the rest is idle or wooded. The reforested areas are in hardwoods and shortleaf pine. (Capability unit I-1; woodland group 1; wildlife group 6)

Tallapoosa Series

The Tallapoosa series consists of well-drained to excessively drained soils that formed in materials weathered mainly from mica schist, quartzite, and mica gneiss. These soils are in the lower mountain ranges, on narrow, long and broken, sloping to steep ridgetops and on short, broken, steep to very steep hillsides. The largest areas are in the lower mountain ranges. Moderately wide to narrow broken bands extend southward on high ridges that generally follow the streams across the survey area.

Typically, in the less eroded areas, these soils have a surface layer of very dark grayish-brown and dark-brown fine sandy loam about 5 inches thick. The subsoil, about 13 inches thick, is yellowish-red sandy clay loam. Below a depth of about 18 inches is weathered saprolitic rock of fine sandy loam texture that is more than 20 feet deep in places. Depth to hard rock is more than 6 feet.

Tallapoosa soils generally occur with Fannin, Hayesville, Musella, Tusquitee, and Chandler soils. Tallapoosa soils have a thinner solum than Madison, Tusquitee, or Hayesville soils, and they have less clayey B horizons than the dark-red Musella soils. Tallapoosa soils contain more clay and have a more strongly developed profile than the Chandler soils.

Soils of this series are low in natural fertility and in content of organic matter. Reaction is strongly acid to very strongly acid. Permeability is moderate, and the available water capacity is low. These soils have a shallow root zone.

Tallapoosa soils are not well suited to farming, because of the shallow root zone and, in places, steep broken slopes. Only a small acreage is cultivated or is used for pasture. The chief trees are post and red oaks, hickory, and shortleaf and Virginia pines. In addition, sweetgum, sourwood, and yellow-poplar grow in some places. The understory is chiefly huckleberries, wild azaleas, and laurel.

Representative profile of Tallapoosa fine sandy loam, 10 to 25 percent slopes (0.7 mile south of Chestatee River along Georgia State Highways No. 60 and No. 249, 50 feet north of road, and 6.4 miles southeast of Dahlonega, Lumpkin County):

O--1 inch to 0, mixed litter and decomposed material.

A1--0 to 3 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; few small schist fragments and small angular quartz gravel; strongly acid; clear, smooth boundary.

A2--3 to 5 inches, dark-brown (7.5YR 4/4) fine sandy loam; weak, fine, granular structure; very friable; few fine mica flakes; many fine roots; strongly acid; clear, wavy boundary.

B1t--5 to 7 inches, yellowish-red (5YR 4/6) sandy clay loam; weak, fine, subangular blocky

structure; friable; few patchy clay films on some peds; few fine mica flakes; few small schist fragments; few medium roots; strongly acid; clear, wavy boundary.

B2t--7 to 12 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, fine, subangular blocky structure; friable; many patchy clay films on peds; few fine mica flakes; few weathered schist fragments; many medium and fine roots; strongly acid; clear, wavy boundary.

B3t--12 to 18 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, fine, subangular blocky structure; soft and friable; few patchy clay films on some peds; few fine mica flakes; many weathered schist fragments; strongly acid; clear, wavy boundary.

C1--18 to 26 inches, yellowish-red (7.5YR 4/8) fine sandy loam; dark grayish brown (10YR 4/2) inside weathered schist; massive; very friable; about 40 percent of volume is weathered schist fragments; strongly acid; clear, wavy boundary.

C2--26 to 72 inches, grayish-brown (2.5Y 5/2) fine sandy loam; massive; very friable; about 65 percent of volume is schist fragments that are black (N 2/0); strongly acid.

The A horizon is mainly dark-brown to very dark grayish-brown fine sandy loam 4 to 12 inches thick, but it ranges between fine sandy loam and loam. Generally, this layer is thicker in areas that have a thin, weakly developed B horizon near rock outcrops. The B2t horizon is yellowish red where the soil formed in material weathered from schist, and the horizon is red where the soil formed in materials weathered from mica gneiss. Mica flakes are few to common in the solum, and there are few to common rock or schist fragments. The thickness of the solum ranges between 12 and 20 inches. Between layers of rock, narrow tongues of material from the B horizon extend to a depth of 3 to more than 5 feet in places.

Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes (TbE).--This soil has cobblestones in its fine sandy loam surface layer. This layer ranges from 7 to 12 inches in thickness but is generally about 9 inches thick. The subsoil is yellowish-red sandy clay loam about 6 inches thick. The thickness of the solum is about 18 inches. Depth to hard rock is generally more than 6 feet.

Included are small areas containing many rock fragments in the solum. Here, the subsoil is generally discontinuous. Small areas of Fannin and Musella soils are also included, as well as small areas of rock outcrops that have little or no soil development. Here, the slope is slightly more than 25 percent.

This Tallapoosa soil is difficult to work because of its shallow root zone and cobblestones. This soil is not suited to farming, but it is suited to woodland and wildlife. Practically all of the acreage has remained in woods. Reforested areas are mainly in Virginia and shortleaf pines. (Capability unit VIIs-1; woodland group 12; wildlife group 5)

Tallapoosa fine sandy loam, 10 to 25 percent slopes (TcE).--In this soil the surface layer ranges from 4 to 12 inches in thickness but generally is about 7 inches thick. Pebbles and schist fragments are on the surface in some places. In most places depth to hard rock is more than 6 feet.

Included with this soil, in some areas, are small areas of Fannin and Hayesville soils that have a solum more than 30 inches deep. Also included, in some places, are areas that have slopes of slightly more than 25 percent. Here, a few rock outcrops occur and there is little or no soil development.

This Tallapoosa soil is not suitable for farming, because it has a shallow root zone and is steep. It is suitable as woodland and for wildlife. Most of the acreage has remained in woods. The reforested areas are in Virginia and shortleaf pines. (Capability unit VIIs-1; woodland group 12; wildlife group 5)

Tallapoosa soils, 25 to 70 percent slopes (TdG).--These soils have steep to very steep, broken slopes and occur in irregular patterns. The surface layer ranges from 4 to 12 inches in thickness and from sandy loam to loam in texture. Pebbles and schist fragments are few to common in most areas. Included with these soils are small areas of Chandler and Musella soils. In a few places, steep escarpments and rock outcrops that have little or no soil development are included.

These soils are not suited to farming. They are suited to trees and wildlife. Practically all of the acreage has remained in woods. Reforested areas are in Virginia and shortleaf pines. (Capability unit VIIs-1; woodland group 12; wildlife group 5)

Toccoa Series

The Toccoa series consists of deep, well-drained soils. These soils occur mainly on narrow to moderately wide flood plains, generally along moderately rapid to rapid streams that have channels ordinarily more than 4 feet deep. Toccoa soils are throughout the survey area; the larger areas are in the southern three-fourths of the survey area.

Typically, the surface layer is dark-brown fine sandy loam about 5 inches thick. Below this layer, to a depth of about 32 inches, is dark-brown fine sandy loam and yellowish-brown sandy loam containing thin bedding planes. At depths between 32 inches and 50 inches are dominantly gray sandy loam and loamy sand that have strong-brown and pink mottles near a depth of 36 inches. Depth to hard rock is more than 6 feet in most places.

These soils are low in natural fertility and organic-matter content. They are medium acid. Permeability is moderately rapid, and the available water capacity is medium. The root zone is deep.

The Toccoa soils are near Congaree, Starr, Cartecay, and Wehadkee soils. The Toccoa soils contain

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less clay than Congaree and Starr soils, and they are better drained than Cartecay and Wehadkee soils.

The soils of the Toccoa series are not extensive in the survey area but occur discontinuously along most streams in small to medium-sized areas. About 75 percent of the acreage is used for crops and pasture; the rest is idle or wooded. In natural wooded areas the chief trees are oaks, hickory, yellow-poplar, sweetgum, maple, and a few pines. Reforested areas are mainly in pine, yellow-poplar, and maple.

Representative profile of a Toccoa fine sandy loam in pasture (200 yards southwest of junction of Georgia Highway No. 9E. and U.S. Highway No. 19; 1.3 miles southwest of old courthouse in Dahlonega; and 110 yards southwest of the forks of Cane and Clay Creeks, Lumpkin County):

Ap--0 to 5 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine mica flakes; medium acid; clear, smooth boundary.

C1--5 to 23 inches, dark-brown (7.5YR 4/4) fine sandy loam; massive; very friable; fine roots common; few fine mica flakes; medium acid; clear, smooth boundary.

C2--23 to 32 inches, yellowish-brown (10YR 5/4) sandy loam; massive; very friable; few fine roots; common fine mica flakes; thin horizontal bedding planes; medium acid; clear, smooth boundary.

C3--32 to 38 inches, gray (10YR 5/1) sandy loam; common, coarse, strong-brown (7.5YR 5/6) mottles and few, fine, pink (7.5YR 7/4) mottles; massive; very friable; common fine mica flakes; medium acid; clear, smooth boundary.

C4--38 to 50 inches, gray (7.5YR 5/1) loamy sand; common, medium, light-gray (N 7/0) mottles; massive; many fine quartz pebbles and many small fragments of dark minerals; medium acid.

The Ap horizon is dark-brown, reddish-brown, or dark reddish-brown fine sandy loam, loam, or loamy sand. The C horizon is mainly sandy loam, but stratification with thin bedding planes of loamy sand or gravelly loamy sand is evident in many places. The colors range from dark brown to reddish brown in the upper part of the C horizon. Some are gray in the lower part, which contains dark-brown to pink mottles. The lower C horizon contains few to common pebbles and mineral fragments.

Toccoa soils (0 to 2 percent slopes) (Toc).--The surface layer of these soils is variable in texture and ranges between loamy sand and loam. The areas are along the flood plains of the larger and smaller streams and are subject to occasional brief flooding in the winter. In some areas flooding occurs during the growing season on an average of once in 3 to 5 years.

Some areas mapped as Toccoa soils contain inclusions of Congaree, Starr, Cartecay, and Wehadkee soils. In a few included areas, slopes range to 5 percent near the foot slopes.

These soils are easy to work and are suited to intensive use. Most locally grown crops, hardwoods, and pine trees are suited to these soils, which respond well to good management. Most of the acreage was cleared and used for crops and pasture at one time. About two-thirds is now cultivated or pastured; the rest is wooded or idle. (Capability unit IIw-2; woodland group 1; wildlife group 6)

Tusquitee Series

The Tusquitee series consists of deep, gently sloping to steep, well-drained soils that formed in local alluvium and colluvium moved from soils derived principally from gneiss, granite, and schist. Tusquitee soils occur in small to medium-sized areas at the base of slopes, in coves, and around drainage heads. Slopes range from 6 to 60 percent. About three-fourths of the acreage occurs where slopes are more than 15 percent, in the northern and western one-fourth of the survey area.

Typically, these soils have a surface layer of very dark gray and dark yellowish-brown loam about 8 inches thick. The subsoil, to a depth of 74 inches or more, is dark-brown and dark yellowish-brown clay loam.

These soils have a deep root zone and are medium to low in natural fertility and in content of organic matter. They are strongly acid throughout the profile. Permeability is moderately rapid, and available water capacity is medium to high.

Tusquitee soils occur with Ashe, Porters, Edneyville, Burton, and Tallapoosa soils. They have a thicker solum than the Edneyville and Porters soils, a finer textured B horizon than the Ashe soils, and a thicker solum with a browner B horizon than the Tallapoosa soils.

The more gently sloping Tusquitee soils are well suited to farming. However, only a small acreage is cultivated or pastured. A high percentage of the more gentle slopes and some steeper slopes were farmed at one time. Most of the acreage is in areas administered by the U.S. Forest Service.

The chief trees are yellow-poplar, white and red oaks, and white pine. The understory is laurel and rhododendron. The reforested areas are mainly in yellow-poplar, together with a few other hardwoods and some pine. Most of the steeper and stonier areas have remained in hardwoods.

Representative profile of Tusquitee loam, 10 to 25 percent slopes (50 yards west of Georgia Highway No. 75-17 and 75 yards north of dirt road at Unicoi Gap, White County):

A11--0 to 3 inches, very dark gray (10YR 3/1) loam; moderate, fine and medium, granular structure; very friable; few fine mica flakes; many small roots; many small root channels; 3 percent angular gravel; strongly acid; clear, wavy boundary.

A12--3 to 8 inches, dark yellowish-brown (10YR 3/4) loam with narrow tongues of very dark gray (10YR 3/1); moderate, fine and medium,

granular structure; very friable; few fine mica flakes; many small roots; many small root channels; 5 percent angular gravel; strongly acid; gradual, wavy boundary.

B1t--8 to 22 inches, dark-brown (10YR 4/3) clay loam with narrow tongues of very dark gray (10YR 3/1) and dark yellowish brown (10YR 3/4); weak, medium, subangular blocky structure; friable; sticky; fine mica flakes common; many fine and medium roots; many small root channels; 10 percent angular gravel and cobblestones; strongly acid; clear, wavy boundary.

B22t--22 to 74 inches +, dark yellowish-brown (10YR 4/4) clay loam; weak, fine and medium, subangular blocky structure; friable; fine mica flakes common; medium roots common; many small pores and root channels; at a depth of 36 inches there is a cobbly layer 12 inches thick; the B horizon continues below this layer; 25 percent cobblestones; strongly acid.

Texture of the A horizon ranges from loam to fine sandy loam. The A horizon contains stones in some areas. The Ap horizon is dark yellowish brown. In areas that have remained in woods, the A1 horizon ranges in thickness from 3 inches on southerly slopes to 9 inches on northerly slopes. The Bt horizons range from loam to clay loam and are generally 1 to 2 hues browner in the lower part. They may have a few distinct mottles in small seepy areas, which occur near the base of slopes. The combined thickness of the A and B horizons ranges from 4 to 10 feet but generally is around 6 feet. Areas that are near Tallapoosa soils have a slightly redder B horizon. Depth to hard rock is more than 4 feet in most places.

Tusquitee loam, 6 to 10 percent slopes (TlC).--The surface layer of this soil is 5 to 8 inches thick. Depth to hard rock is more than 6 feet in most places. Some areas mapped as this soil contain inclusions having a gravelly or cobbly fine sandy loam surface layer, and there are a few eroded spots. Small areas of Porters soils are included in some localities. Here, the solum is less than 40 inches thick.

This Tusquitee soil is easily worked and has a deep root zone. It is suited to moderately intensive use. All commonly grown crops and yellow-poplar are suited to this soil, which responds well to good management. The hazard of erosion is moderate to moderately severe in the cultivated fields. Only a small acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIIe-1; woodland group 7; wildlife group 1)

Tusquitee loam, 10 to 25 percent slopes (TlD).--This is the most extensive soil of the Tusquitee series in this survey area. It occurs in friable colluvial deposits, has concave slopes, and lies in coves and small valleys. These are mainly moist sites, especially near the base of slopes, where hardwood trees thrive. The profile of this soil is the one described as representative for the series. Depth to hard rock is more than 6 feet in most places.

Some areas included in mapping consist of soils that contain a considerable amount of gravel or cobblestones. Also included are a few eroded spots where the surface layer is about 4 inches thick and where a few shallow gullies have been formed. In a few places, small areas of Ashe and Porters soils are included. Here, the solum is less than 40 inches thick.

This Tusquitee soil is not suited to intensive use but is well suited to hay crops and pasture. All locally grown hay and pasture crops, yellow-poplar, and pine trees are well suited. This soil responds well to good management. The hazard of erosion is moderately severe to severe in sparsely vegetated or cultivated areas. Only a small acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IVe-1; woodland group 7; wildlife group 2)

Tusquitee loam, 25 to 60 percent slopes (TlF).--This steep Tusquitee soil occurs in colluvial deposits, mainly in depressions, on hillsides and mountains. Depth to hard rock is more than 4 feet. Some included areas mapped as this soil have a fine sandy loam surface layer, which may contain a considerable amount of gravel. In a few places, small areas of Ashe and Porters soils are also included. Here, the solum is less than 40 inches thick.

This soil is not suited to intensive use, because of steep slopes. It is well suited to trees such as yellow-poplar, oaks, and white pine. The hazard of erosion is severe to very severe in cultivated or sparsely vegetated areas. Practically all of the acreage has remained in woods. (Capability unit VIIe-1; woodland group 7; wildlife group 4)

Tusquitee stony loam, 10 to 25 percent slopes (TmE).--The surface layer of this soil is 3 to 9 inches thick and contains a considerable amount of stones. The subsoil contains few to common pebbles, cobblestones, and stones. Depth to hard rock is generally 5 feet or more (pl. V, top left).

In a few areas included in mapping, the slopes are slightly less than 10 percent; in others, slightly more than 25 percent. Also included are small areas where the surface layer is fine sandy loam. In a few places, small areas of Porters soils are included. Here, the soils are less than 40 inches thick.

This Tusquitee soil is difficult to work. It is not suited to intensive use, because of stones on the surface. It is well suited to trees such as yellow-poplar, red and white oaks, and white pine. The hazard of erosion is moderate to moderately severe in cultivated or sparsely vegetated areas. Practically all of the acreage has remained in trees. (Capability unit VIIs-1; woodland group 7; wildlife group 2)

Tusquitee stony loam, 25 to 60 percent slopes (TmF).--This soil occurs in depressions and coves on mountainsides. It has formed in moist, brown, colluvial deposits. The profile is similar to the one described for the series, but it differs in that stones and cobblestone are on the surface and within the profile. Depth to hard rock is 5 feet or more. Included are small areas of Ashe, Tallapoosa, and Porters soils. Here, the solum is thinner than 36 inches. In a few places, rock outcrops are included.

This soil is not suited to intensive use, because of its stony surface layer and steep slopes. It is better suited to trees, such as yellow-poplar, red and white oaks, and white pine. The hazard of erosion is severe to very severe in cultivated or sparsely vegetated areas. Practically all of the acreage has remained in trees. (Capability unit VIIs-1; woodland group 7; wildlife group 5)

Wehadkee Series

The Wehadkee series consists of deep, poorly drained, alluvial soils. These soils commonly occur in small areas on moderately wide flood plains along the larger streams of the survey area. Generally, they are near the foot of slopes.

Typically, the surface layer, about 6 inches thick, is very dark gray silt loam that is mottled with strong brown and red. In some places the surface layer is clay loam. The subsoil is grayish-brown and dark-gray sandy clay loam that contains light olive-brown and strong-brown mottles in the upper part. This layer is 36 inches thick. The substratum is dark-gray sandy loam. Depth to hard rock is more than 8 feet in most places.

These soils are low in natural fertility and organic-matter content. They are medium acid to strongly acid. Permeability is moderate, and the available water capacity is medium. The root zone is determined by the depth to the water table.

Wehadkee soils occur near Congaree, Cartecay, Starr, Toccoa, and Augusta soils. They are more poorly drained than the somewhat poorly drained Cartecay and Augusta soils and the well-drained Congaree, Starr, and Toccoa soils.

The Wehadkee soils are not extensive in the survey area and occur only in small areas in the wider bottoms along the larger streams. They are frequently flooded and are ponded for long periods. The soils are difficult to work. They are suited mainly to water-tolerant pasture plants and trees unless they are drained.

Pasture grasses and clovers show fair to moderate response to fertilization and good management. About half of the acreage of these soils was used for pasture and crops at one time. At present, however, only a small acreage is used for pasture and crops; the rest is idle or wooded. The natural and reforested areas are chiefly in hardwoods, such as sweetgum, yellow-poplar, blackgum, alder, birch, and willow.

Representative profile of a Wehadkee silt loam (0.4 mile southwest of Yonah, 2.1 miles north of Cleveland, and 150 yards east of Tenatee Creek, White County):

Ap--0 to 6 inches, very dark gray (10YR 3/1) silt loam; common, medium, distinct, strong-brown (7.5YR 5/6) and red (2.5YR 4/6) mottles; weak, medium and coarse, granular structure; friable; many fine mica flakes; few fine roots; medium acid; clear, smooth boundary.

B1g--6 to 19 inches, grayish-brown (2.5Y 5/2) sandy clay loam; few large, faint, light olive-brown (2.5Y 5/4) and strong-brown (7.5YR 5/6) mottles; weak, medium, subangular blocky structure; friable; few fine mica flakes; few small roots; few coarse sand grains; few, small, rounded pebbles; strongly acid; clear, smooth boundary.

B2g--19 to 42 inches, dark-gray (5Y 4/1) sandy clay loam; weak, medium, subangular blocky structure; friable; few fine mica flakes; few fragments of decomposed roots; few coarse sand grains; medium acid; clear, smooth boundary.

C--42 to 60 inches, dark-gray (10YR 4/1) sandy loam; massive; slightly firm; few fine mica flakes; many coarse sand grains; few, small, rounded pebbles; strongly acid.

The Ap horizon ranges from 4 to 10 inches in thickness and generally is very dark gray to olive-gray loam or silt loam. In some areas, however, the horizon is clay loam or fine sandy loam having strong-brown and red mottles. The B1g horizon is grayish-brown, black, or gray and contains light olive-brown and strong-brown mottles. The B2g horizon is gray to black and contains brown, small and medium root channels. The C horizon is generally stratified and ranges from sandy loam to gravelly sand. The thickness of the solum ranges from 38 to 60 inches.

Wehadkee soils (0 to 2 percent slopes) (Wed).--The plow layer of these soils ranges from silt loam to fine sandy loam or, in some places, to clay loam. Areas along the flood plains are subject to frequent flooding during the growing season, and many areas are ponded for long periods.

Some areas mapped as these soils contain inclusions of Cartecay and Toccoa soils and a soil that is continuously very dark gray to depth of about 32 inches.

Wehadkee soils are difficult to work and are not suited to farming or other intensive use, because of frequent flooding and long periods of ponding. They are suited mainly to clover and water-tolerant grasses and hardwoods, such as sweetgum, yellow-poplar, black gum, alder, birch, and willow. The soils respond moderately well to good management. About half of their acreage was cleared and used for crops and pasture at one time. Now, only a small acreage is used for pasture; the rest is idle or wooded. (Capability unit IVw-1; woodland group 2, wildlife group 6)

Wickham Series

The Wickham series consists of deep, gently sloping to steep, well-drained soils that formed in materials from soils derived from gneiss, granite, and schist. Wickham soils are on uplands; they lie at the foot of slopes, in saddles, and around drainage heads. They are in irregularly shaped areas of small to medium size. The largest areas occur on steeper slopes in the mountain foothills, but small areas are scattered throughout the survey area.

Typically, in the less eroded areas, these soils have a surface layer of dark-brown fine sandy loam about 8 inches thick. The subsoil is mainly sandy clay loam that extends to a depth of 72 inches or more. The upper part of the subsoil is reddish brown and yellowish red; the lower part is red and contains many reddish-yellow mottles below a depth of about 52 inches. Depth to hard rock ranges from 6 to 20 feet but is generally more than 10 feet.

These Wickham soils are low in natural fertility and organic-matter content. They are strongly acid throughout the profile. Permeability is moderate. The available water capacity is medium. The root zone is deep.

Wickham soils occur with Hiwassee, Hayesville, Masada, and Fannin soils. They are less red and less clayey than Hiwassee soils, they have a thicker solum than the Hayesville soils and Fannin soils, they contain less mica than the Fannin soils, and they are not so yellow as the Masada soils.

Wickham soils are well suited to farming in the more gently sloping areas. About half the acreage on these slopes is cultivated or pastured. The chief trees are pines, oaks, hickory, and yellow-poplar. Reforested areas are chiefly in shortleaf and Virginia pines.

Representative profile of Wickham fine sandy loam, 6 to 10 percent slopes, in a stand of young pines (100 yards southeast of Mt. View Church, 2.1 miles southwest of Cleveland, and 100 yards north of Georgia Highway No. 115, White County):

Ap--0 to 8 inches, dark-brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine mica flakes; few fine pores; strongly acid; gradual, smooth boundary.

B1t--8 to 15 inches, reddish-brown (5YR 5/4) sandy clay loam; weak, medium, subangular blocky structure; very friable; few patchy clay films; many fine roots; few fine mica flakes; few small pores and root channels; strongly acid; gradual, smooth boundary.

B21t--15 to 27 inches, yellowish-red (5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; many patchy clay films; few fine roots; few fine mica flakes; few small pores and root channels; strongly acid; gradual, smooth boundary.

B22t--27 to 52 inches, red (2.5YR 4/6) sandy clay loam; moderate, medium, subangular blocky structure; friable; many patchy clay films; few fine mica flakes; few root channels; strongly acid; gradual, smooth boundary.

B23t--52 to 72 inches +, red (2.5YR 4/6) sandy clay loam; many, fine, distinct, reddish-yellow (5YR 6/6) mottles; moderate, medium, subangular blocky structure; friable; few patchy clay films; few fine mica flakes; many coarse sand grains; strongly acid.

The Ap horizon generally is dark-brown or dark yellowish-brown to very dark grayish-brown fine sandy loam 4 to 10 inches thick. In severely eroded areas, the Ap horizon is reddish-brown or yellowish-brown sandy clay loam. The B1t and B21t horizons are reddish-brown or yellowish-red sandy clay loam. The B22t and B23t horizons are yellowish-red or red sandy clay loam. Mottles commonly occur at depths ranging from 36 to 50 inches. The thickness of the solum ranges from 4 to more than 6 feet.

Wickham fine sandy loam, 6 to 10 percent slopes (WgC).--This soil has the profile described as representative for the series. The plow layer ranges from 5 to 10 inches in thickness but is generally about 8 inches thick. Depth to hard rock is more than 8 feet in most places (pl. V, top right).

Areas mapped as this soil include a few severely eroded areas in which the surface layer is sandy clay loam. In other areas rounded and angular gravel is on the surface and in the profile. A few areas have slopes of slightly less than 6 percent. Also included are a few areas of Hayesville soils and Fannin soils that are less than 40 inches thick.

This Wickham soil generally is easily worked. It is well suited to moderately intensive use. All locally grown crops and pine trees are suited. This soil responds well to fertilization and good management. The hazard of erosion is moderate to moderately severe in cultivated areas. About half of the acreage is cultivated or pastured; the rest is wooded or idle. (Capability unit IIIe-1; woodland group 3; wildlife group 1)

Wickham fine sandy loam, 10 to 25 percent slopes (WgD).--This soil occurs in saddle-shaped areas and along stream divides in the mountain foothills. The surface layer is 4 to 10 inches thick and contains some fine and medium gravel in places. Depth to hard rock is generally 7 feet or more. Included in mapping are few eroded areas scattered throughout. Also included are areas of Hiwassee and Hayesville soils.

This Wickham soil generally is difficult to work because of its steep slopes. It is suited to intensive use but is better suited to hay and pasture. This soil responds well to fertilization and good management. The hazard of erosion is moderately severe to severe in cultivated areas.

Most of this soil was cultivated and pastured at one time. About one-third of the acreage is now cultivated or pastured; the rest is wooded or idle. The reforested areas are chiefly in Virginia and shortleaf pines. (Capability unit IVe-1; woodland group 3; wildlife group 2)

Wickham fine sandy loam, 25 to 50 percent slopes (WgF).--This steep soil occurs in small areas on hillsides throughout the survey area, mainly in Lumpkin County. The surface layer is 4 to 8 inches thick and contains gravel and cobblestones in places. Depth to hard rock is 8 feet or more. Near adjacent residual soils the depth to the underlying material tends to be 1 to 3 feet less than in most other places. Small areas of Hayesville and Fannin soils are included. Also included are a few eroded spots where the surface layer is red sandy clay loam.

This Wickham soil is difficult to work because of its steep slopes. Although it has a deep root zone, it is not suited to intensive use. However, it is well suited to trees. The hazard of erosion is severe to very severe in cultivated and sparsely vegetated areas. A very small acreage is cultivated or is used for pasture; the rest is wooded or idle. Reforested areas are chiefly in Virginia and shortleaf pines. (Capability unit VIIe-1; woodland group 7; wildlife group 4)

Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded (WnD3).--This soil is eroded to the extent that the present surface layer is mainly a mixture of the upper part of the subsoil and remnants of the original surface layer. The present surface layer is reddish-brown or yellowish-brown sandy clay loam 4 to 7 inches thick. Shallow to moderately deep gullies are few to many and are scattered infrequently in most areas. These gullies expose the reddish-brown sandy clay loam subsoil. Depth to hard rock is 7 feet or more. Included in mapping are a few areas where the slope is slightly less than 10 percent. Also included are a few areas of Hiwassee soil.

This Wickham soil is difficult to work because the sandy clay loam surface layer is sticky when wet and hard when dry. The soil is not well suited to intensive use. It is better suited to commonly grown hay and pasture crops and pine trees. Hay and pasture crops show fair to good response to fertilization and good management. The hazard of further erosion is moderately severe to severe in cultivated areas.

All the acreage of this soil was used for cultivation and pasture at one time. Only a small part of the acreage is now cultivated or used for pasture; the rest is idle or wooded. Reforested areas are chiefly in Virginia and shortleaf pines. (Capability unit VIe-2; woodland group 14; wildlife group 3)

Typical landscape in the Cartecay - Toccoa - Congaree soil association.

Corn growing on Congaree and Starr soils, Cartecay - Toccoa - Congaree soil association.
Grimes Nose Mountain in background is in the Hayesville - Fannin - Edneyville association.

PLATE II

In the foreground and extending to the farm buildings is a typical landscape in the Hayesville-Fannin-Wickham soil association. The mountain in the background is in the Edneyville-Porters-Ashe soil association.

Kentucky 31 fescue on Congaree and Starr soils.

Homesite on Hayesville sandy loam, 6 to 10 percent slopes.
Cabbage in foreground; tomatoes, corn, and apple trees in background.

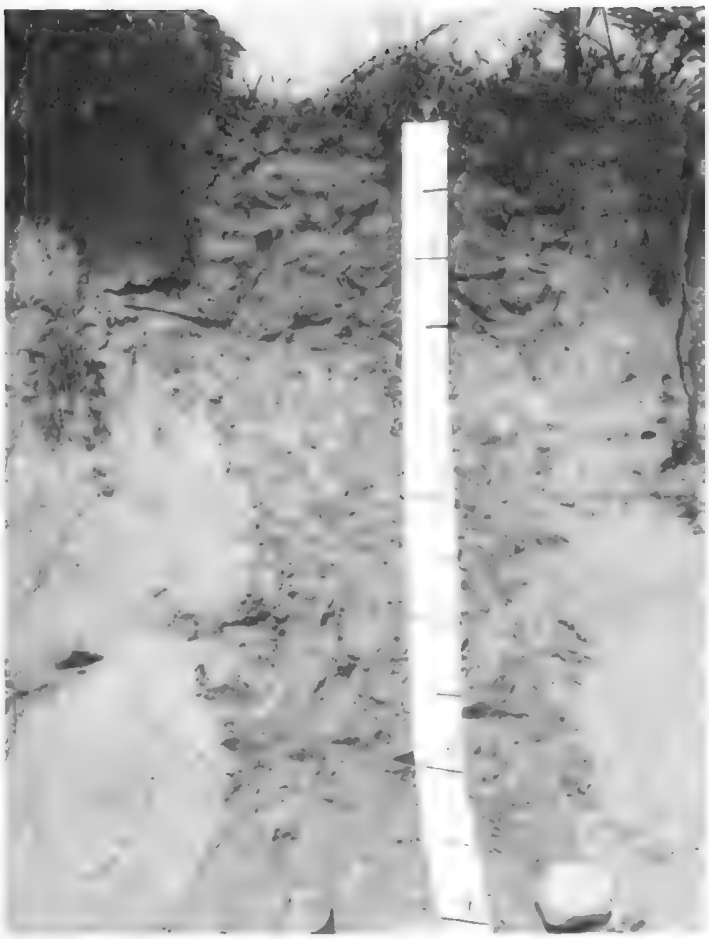
Profile of Hayesville sandy loam, 10 to 25 percent slopes. Weathered rock is at a depth of about 30 inches.

Bell peppers and cabbage on Hiwassee loam, 2 to 10 percent slopes. This soil commonly occurs at the base of moderate to steep slopes, and it is often used for truck crops.

A profile of Rabun loam, 15 to 25 percent slopes. The weathered rock extends to a depth of more than 10 feet. Vertical tape shows depth in feet.

Rock land, a miscellaneous land type that is generally bare but in some places supports a sparse growth of plants.

Profile of Tusquitee stony loam, 10 to 25 percent slopes. Material from this soil is commonly used for surfacing roads.



Profile of Wickham fine sandy loam, 6 to 10 percent slopes, a soil that occurs on foot slopes and in saddles. Roots have penetrated deeply into this soil. Tape shows depth in feet.

An area developed for camping, picnicking, and trout fishing in the Cartecay-Toccoa-Congaree soil association. Toccoa soils are in the foreground.

PLATE VI

Many flood retarding structures in the survey area, built to protect the flood plain as part of the watershed program, also provide recreation areas for fishing, boating, and camping. This structure is located on Fannin fine sandy loam, 10 to 25 percent slopes.

Privately developed lakes are popular throughout the survey area and are used for fishing, boating, and hiking. This lake is on a Hayesville sandy loam and Fannin fine sandy loam, 10 to 25 percent slopes.

In this section the system of capability grouping used by the Soil Conservation Service is discussed, the soils in each capability unit are described, and management suited to the soils in each unit is suggested. Following this, estimated acre yields of the principal crops are given for all of the soils in the survey area, and the management required to obtain these yields is described.

Capability Classification

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops, or to rice and other crops that have special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive alterations that could be made in slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all soils are grouped at three levels: the capability class; the subclass; and the unit, These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest grouping, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V soils are subject to little or no erosion but have other limitations, impractical to remove, that confine their use largely to pasture, range, woodland, or wildlife food and cover. (There are no class V soils in these counties.)

Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to grazing, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; c, used in some parts of the United States but not in this survey area, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only subclasses indicated by w, s, and c, because the soils in it are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIw-2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs; and the Arabic numeral specifically identifies the capability unit. The capability units are not numbered consecutively within the subclasses, because they fit into the Statewide system of capability classification, and not all the capability units in the State are represented in these counties.

Capability Unit I-1

The only soil in this unit is Starr fine sandy loam, a deep, well-drained, nearly level soil on stream terraces. The slopes range from 0 to 4 percent. The surface layer is very friable and is 5 to 10 inches thick. The subsoil is mainly sandy clay loam to clay loam.

The infiltration rate is medium, permeability is moderately rapid, and the available water capacity is high. This soil has a low to moderate supply of organic matter and is moderate to low in fertility. It is strongly acid, is easily worked, and has a deep root zone.

About 85 percent of the acreage is cultivated or in pasture. Corn is the principal crop, but truck crops are also grown. Tall fescue, orchardgrass, lespedeza, and bermudagrass are important hay and pasture plants. All the common crops are suited, and all locally grown grasses and legumes are well suited.

This soil has few limitations that restrict its use, and it responds to good management. All plant residue should be mowed or chopped and left on the surface between cropping seasons, and whenever possible, left on or near the surface during the cropping season. Field borders should be seeded to perennial grass to provide places where farm machinery can be turned safely. The application of lime every 3 to 5 years is needed for a good growth of crops, and so is annual fertilization.

An example of a suitable cropping system is one in which a row crop, such as corn, is grown each year and a winter cover crop is grown every other year to improve soil tilth.

Special management practices are not generally required to keep the soil easily workable. The soil can be worked safely throughout a wide range of moisture content, and generally there is little or no erosion hazard, but a few low areas are subject to occasional flooding of short duration.

Capability Unit IIe-2

This unit consists of well-drained soils on rolling uplands and on stream terraces. The slopes range from 2 to 6 percent. Some areas are gravelly. The surface layer is very friable sandy loam or fine sandy loam. The subsoil is sandy clay loam to clay. Depth to bedrock is generally more than 4 feet.

The infiltration rate is medium, permeability is moderate, and the available water capacity is medium. These soils are low in natural fertility and in organic-matter content. The effective root zone ranges from 24 inches in the soils that contain some schist fragments to more than 48 inches in old local alluvial areas. These soils are strongly acid.

These soils can be used for moderately intensive purposes. Corn is the principal crop, but a small acreage is used for truck crops. Among the well-suited legumes are white clover, sericea lespedeza, annual lespedeza, crimson clover, vetch, and Austrian winter peas. Well-suited grasses are tall fescue, orchardgrass, bermudagrass, and dallisgrass.

The erosion hazard is slight to moderate. However, terraces are not generally used, because of the small size of the areas, the topographic position, or the complex slopes. Planting a close-growing crop every other year helps to control erosion, to maintain good tilth, and to supply organic matter. All residue should be kept on the surface between growing seasons and on or near the surface during the season of row-crop production.

The steepness and length of the slopes, and the practices used to control erosion, influence the kind of cropping system needed to control erosion. An example of a suitable cropping system on a terraced slope of 3 percent is one in which a row crop, such as corn, is grown each year and the residue is mowed, chopped, or disked for winter cover.

Liberal applications of phosphate, potash, and nitrogen are generally needed for a good growth of all crops. Legumes grow best if lime is added. Most grasses and row crops also respond to lime. Diversions and vegetated waterways help to control erosion in some areas. The addition of organic matter preserves favorable soil structure, increases infiltration, and improves water-holding capacity.

Capability Unit IIe-3

The only soil in this unit is Fannin fine sandy loam, 2 to 6 percent slopes, a deep to moderately deep, well-drained soil on ridgetops and hillsides. The surface layer is very friable fine sandy loam. The subsoil is chiefly clay loam that has a high mica content at lower depths. Depth to hard rock is 8 feet or more.

Natural fertility is low. The infiltration rate is medium, and the available water capacity is medium. This soil is strongly acid, is easily worked, and has a moderately deep to deep root zone.

About 20 percent of the acreage is cultivated, and about 30 percent is in pasture. The remaining acreage is forested, mainly to pines with some hardwoods. Corn, truck crops, and hay are the principal crops, but all of the crops common to the three counties are grown. The pasture grasses and legumes most commonly grown are tall fescue, orchardgrass, bermudagrass, lespedeza, and white and red clovers.

Crop residues should be left on the surface between growing seasons, and whenever possible, on or near the surface during the growing season. Erosion is a slight to moderate hazard. The steepness and length of slopes, and the practices used to control erosion, influence the cropping system. An example of a suitable cropping system, for a slope of 5 percent averaging 150 feet long with rows on the contour but not terraced, is one in which a grass is grown for 2 years and a row crop is grown for 1 year. These soils respond well to large amounts of fertilizer and to additions of lime and organic material. Liberal applications of a complete fertilizer and lime are needed to establish pastures of high quality.

Capability Unit IIw-2

This unit consists of well-drained, nearly level soils on flood plains, on fans, or in narrow strips along small streams. Some areas are slightly depressed. The slopes range from 0 to 2 percent. The surface layer is mainly very friable and is medium textured to coarse textured. The subsoil ranges from clay loam to sandy loam, loamy sand, and gravelly loamy sand.

The infiltration rate is medium to rapid, permeability is moderate to moderately rapid, and the available water capacity is medium to high. Natural

fertility is moderately low to low. These soils are strongly acid to medium acid and have a deep root zone.

Most of the cultivated acreage is used for corn and truck crops, and many areas are used continuously for row crops. These soils are especially well suited to pasture and good stands of grasses and legumes. Plants on these soils continue to grow during dry periods when plants on the uplands are wilted. However, the range of suitable crops is medium because of the flooding hazard and high water table. Small grain grows well but tends to lodge and mature later than on well-drained soils of the uplands and terraces. Grain sorghum is also suited.

Generally, there is little or no erosion hazard, but flooding is a limitation. Some surface drainage may be needed for maximum use of the soils for crops. An example of a suitable cropping system is one in which corn is grown each year and the crop residue is left for winter cover. Planting vetch at the last cultivation will supply additional organic material and nitrogen for the succeeding crop of corn. Generally, crops can be grown without the use of fertilizer, but liberal amounts of phosphate and potash are needed for plants to grow well under intensive cropping. Nitrogen is needed for all crops except legumes. The application of lime every 3 to 5 years is needed for a good growth of crops.

Capability Unit IIIe-1

This unit consists of well-drained soils on uplands and on stream terraces. The slopes range from 2 to 10 percent. The surface layer is friable to very friable fine sandy loam or loam. The subsoil is commonly friable to firm sandy clay loam to clay. Depth to bedrock is generally more than 5 feet, and commonly 6 to more than 10 feet.

The infiltration rate is moderately rapid where the surface layer is moderately coarse textured, and it is moderate where the surface layer is moderately fine textured. Natural fertility is low to moderate, and the available water capacity is medium to moderately high. These soils have a deep root zone and are strongly acid. Except for the clay loam surface layer in severely eroded spots, these soils are easily worked and are easily kept in good tilth. Included spots that have a clay loam surface layer can be plowed only within a narrow range of moisture content without clodding.

About 20 percent of the acreage is cultivated, 35 percent is in pasture, and the rest is wooded. Corn and truck crops are the main crops. Lespedeza, tall fescue, and small grain are grown mainly for hay and pasture.

These soils are well suited to all crops commonly grown in the survey area, particularly corn, soybeans, grain sorghum, millet, and truck crops. Some of the most suitable hay and pasture grasses are tall fescue, dallisgrass, ryegrass, bermudagrass, and orchardgrass. The better suited legumes are alfalfa, sericea lespedeza, crimson clover, white clover, vetch, and Austrian winter peas. Although field observations show that these soils warm 14 to 21 days earlier in spring than the grayer soils, cold weather is a hazard. Severe cold weather sometimes damages small grain and newly seeded pasture grasses on the severely eroded areas by causing frost heave that pulls young plants out of the soil.

All plant residue should be mowed or chopped soon after harvest and left on the surface between cropping seasons and on or near the surface during the cropping season. A perennial crop should be used in a cropping system whenever possible.

Erosion is the dominant hazard. Where these soils are cultivated, adequate cropping systems and erosion control measures should be installed to limit soil and water losses. A suitable cropping system for a terraced slope of 6 percent is one in which continuous row crops, such as corn or grain sorghum, are mulch planted or planted directly in stubble or residue of previous crops. A perennial grass should be maintained in waterways and is desirable in field borders.

Turning under crop residues or green-manure crops in the spring helps to increase the available water capacity. These soils respond well to fertilization and to other good management.

Capability Unit IIIe-2

This unit consists of well-drained, slightly eroded to moderately eroded soils, chiefly on uplands. The slopes range from 6 to 10 percent. The surface layer is very friable sandy loam, fine sandy loam, or loam. The subsoil is sandy clay loam to clay. The depth to bedrock is 5 to more than 8 feet.

The infiltration rate is medium, permeability is moderately rapid, and the available water capacity is medium. These soils are low to moderate in natural fertility and are strongly acid to medium acid. The root zone is moderately deep to deep. The soils in this unit absorb water somewhat more rapidly and can be plowed over a wider range of moisture content than the soils in unit IIIe-1. They are easily worked and do not puddle or clod readily.

About 10 percent of the acreage is cultivated, mainly to corn and truck crops. Around 40 percent is in pasture consisting of native grasses, tall fescue, and bermudagrass. The rest is in woods, mostly hardwoods and pine. The common crops are corn, grain sorghum, small grain, soybeans, and truck crops.

These soils are suited to most of the crops grown in the survey area, but field observations show that they generally warm 14 to 21 days later than the redder soils. Alfalfa is not well suited, but most grasses and legumes common in the survey area can be grown on these soils.

These soils are likely to erode if they are cultivated, and they are not suited to intensive use. If they are cultivated, the cropping sequence should

include close-growing or sod crops. Cropping systems that include small grain, grasses, and legumes may be more profitable than ones that include row crops only.

All crop residues should be mowed or chopped soon after harvest and left on the surface between cropping seasons, and whenever possible, on or near the surface during the cropping season. Applications of lime every 3 to 5 years and annual fertilization are beneficial. A suitable cropping system for a slope of about 7 percent that is 150 feet long is one in which 2 years of grass, such as fescue, is followed by 2 years of row crops, such as truck crops or corn. This system ought to be arranged in alternating parallel strips and crops planted on the contour.

Erosion can be controlled by the use of close-growing crops. Where the slopes are short and complex, terracing is difficult. Where the slopes are long, parallel stripcropping or contour stripcropping can be used to help control erosion.

Capability Unit IIIe-3

The only soil in this unit is Fannin fine sandy loam, 6 to 10 percent slopes, a well-drained, deep to moderately deep soil that occurs on ridgetops and short to moderately long hillsides. The surface layer is very friable. The subsoil is sandy clay loam to silty clay loam and generally has a moderate to high mica content that increases with depth. Depth to hard rock is 7 to more than 10 feet.

The infiltration rate is medium, and the available water capacity is medium. Natural fertility is low, but the soil is easily worked because it is in good tilth and has a moderately deep to deep root zone. This soil is strongly acid and is suited to many kinds of crops grown in the survey area.

About 20 percent of the acreage is cultivated, and about 30 percent is used for pasture. The remaining acreage is forested, mainly to pines and some hardwoods. Corn, truck crops, and hay are the principal crops, but all of the crops common in this survey area are grown. The pasture grasses and legumes most commonly grown are tall fescue, orchardgrass, bermudagrass, lespedeza, and white and red clovers.

Erosion is a hazard because of slope, and management is needed that controls soil losses. The steepness and length of slopes govern the minimum cropping system and the erosion control measures needed to accomplish this. An example of a suitable cropping system, for a slope of 7 percent that averages 150 feet long and has rows on the contour but not terraced, is one in which grass is grown for 3 years and is followed by 1 year of a row crop.

Crop residues should be mowed or chopped and left on the surface between cropping seasons, and whenever possible, on or near the surface during the growing season. Crops respond well to large amounts of fertilizer and to additions of lime and organic material. Liberal applications of a complete fertilizer and lime are needed to establish pastures of high quality.

Capability Unit IIIw-2

The only soils in this unit are those of the Cartecay complex. These are deep, somewhat poorly drained to moderately well drained soils on flood plains. The slopes range from 0 to 2 percent. The surface layer is variable in texture and ranges from loam to loamy sand. The underlying layers are predominantly mottled loam to loamy sand.

The infiltration rate is medium to rapid, permeability is moderately rapid, and the available water capacity is medium to low. Natural fertility is low. These soils are medium acid.

Less than 5 percent of the acreage is in pasture. The remainder is cultivated or in woods. Most of the cultivated acreage is used for corn. The range of suitable crops is narrow because of the high water table and frequent overflow hazard. However, plants on these soils continue to grow during dry periods when plants on uplands are wilted. Corn and oats are fairly well suited. These soils are especially well suited to pasture. Good stands of grasses and legumes can be readily established, and most of the common pasture grasses can be grown.

Erosion is not a hazard on these soils. Row crops can be grown continuously if flooding is controlled and the soils are adequately drained. A rotation of corn and a hay crop is well suited. An example of a suitable cropping system for this soil is one in which grass is grown for 2 to 3 years and is followed by 2 to 3 years of row crops, such as corn. Liberal amounts of phosphate and potash are needed to maintain intensive cropping. Nitrogen is needed for all crops except legumes, and an application of lime every 3 to 5 years is advised.

Capability Unit IIIw-3

The only soil in this unit is Augusta fine sandy loam, 2 to 6 percent slopes, a deep to moderately deep, somewhat poorly drained soil on low stream terraces, around the heads of drains, and at the base of slopes. The surface layer is very friable. The subsoil is mottled, chiefly friable clay loam. Depth to bedrock is generally more than 5 feet.

The infiltration rate is medium to slow, permeability is moderate, though water is commonly perched above the underlying material, and the available water capacity is medium. Natural fertility and content of organic matter are low. This soil is easily worked and is strongly acid. Plant roots can penetrate effectively to a depth of only 22 to 30 inches unless the soil is drained.

About half of the acreage is wooded; the rest is mostly in pasture, but a few small areas are in cultivation. Native grasses, tall fescue, and lespedeza are the principal pasture plants. This soil is poorly suited to row crops, but it is well suited to a medium range of pasture grasses and legumes. Grain sorghum and soybeans are well-suited cultivated crops; tall fescue, dallisgrass, and common bermudagrass are well-suited grasses; lespedeza and white clover are well-suited legumes.

Wetness is a moderate to severe limitation. Water stands on the surface in places, and the water table is high for long periods during rainy seasons. The risk of damage to clean-cultivated crops, or failure of those crops, is moderately high unless the soil is adequately drained. Water-tolerant pasture grasses and legumes are better suited. A suitable cropping system is one in which a row crop, such as grain sorghum, is grown each year and crop residue is returned to the soil to improve tilth. Moderately high fertilization is required for all crops. All commonly grown plants respond to lime.

In places where excess water can be controlled by diversion ditches and other drainage systems, these soils are suited to a medium range of crops. However, drainage is not feasible in many areas, because of the clayey subsoil, lack of outlets, and a seasonal high water table. Lateral movement of water is slow. Open ditches can be used to remove surface water in some areas.

Capability Unit IIIs-1

The only soil in this unit is Buncombe loamy sand, an excessively drained, frequently flooded soil on first bottoms along the larger streams. The surface layer is very friable, but in some places it contains gravel. Underlying this layer is mainly loamy sand and gravelly sand. Many areas have an irregular surface.

The infiltration rate is rapid, permeability is rapid, and the available water capacity is low. Natural fertility and content of organic matter are low. This soil is easily worked. It is strongly acid to medium acid. Plant roots can penetrate effectively to a depth of more than 36 inches.

About 40 percent of the acreage is wooded. Most of the rest is in pasture, but a few small areas are in cultivation. Native grasses, bermudagrass, and annual lespedeza are the principal pasture plants. This soil is moderately well suited to some cultivated crops, well suited to several kinds of pasture grasses, and moderately suited to a few kinds of legumes. Corn, cowpeas, and watermelons are some of the well-suited cultivated crops; coastal bermudagrass and common bermudagrass are well-suited grasses; and sericea lespedeza is a well-suited legume. Droughtiness is a moderate to severe hazard, and the risk of damage to cultivated crops is moderately high. Deep-rooted plants are better suited. If this soil is used for cultivated crops, large amounts of plant residue should be returned to the soil frequently. An example of a suitable cropping system is one in which grass is grown for 2 to 3 years and a row crop, such as watermelon, is grown for 1 year.

A moderately high rate of fertilization is required for all crops. All commonly grown row crops and pasture respond to lime. If annuals are grown, all residue should be kept on the surface between cropping seasons and on or near the surface during cropping seasons to maintain organic-matter content and fertility. The lack of adequate moisture in dry periods, the highly leachable soil, and occasional flooding that results in scouring and fresh deposits of soil material are the principal hazards.

Capability Unit IVe-1

This unit consists of well-drained soils on uplands, stream terraces, and foot slopes. The slopes range from 6 to 25 percent. In most areas the surface layer is loam, sandy loam, or fine sandy loam. In the remaining areas, which are severely eroded, this layer is clay loam or sandy clay loam. The subsoil commonly is sandy clay loam to clay. The depth of hard rock is 4 to more than 10 feet.

The infiltration rate is moderate to moderately slow. It depends on slope and texture of the surface layer. Permeability is moderate to moderately rapid. The available water capacity is chiefly medium but ranges from low to high. These soils have medium to rapid surface runoff and are very susceptible to sheet erosion. Generally, the root zone is deep. Natural fertility is mainly low but ranges to medium. The soils that have a loam, sandy loam, or fine sandy loam surface layer generally are easily worked. The soils having a clay loam or sandy clay loam surface layer tend to puddle when plowed wet and to clod when plowed dry. These soils are strongly acid to slightly acid.

About 50 percent of the acreage has been cultivated, but now most of the previously cultivated acreage has been reforested to pines. Only a small part of the remaining acreage is cultivated or in pasture. These soils are suited to all of the commonly grown crops. They are well suited to red clover, sericea lespedeza, white clover, and annual lespedeza. They are also well suited to coastal bermudagrass, common bermudagrass, tall fescue, dallisgrass, ryegrass, and bahiagrass. The most commonly grown crops are corn, small grain, sericea lespedeza, and some truck crops. Pastures include such grasses and legumes as tall fescue, bermudagrass, native grasses, orchardgrass, lespedeza, and white clover. Crops are more difficult to establish and require more careful management than on the soils in units IIIe-1 and IIIe-2.

Erosion is chiefly a moderately severe to severe hazard on these soils. Row crops should not be grown for more than 2 consecutive years following 4 to 6 years of a sod crop. All residues should be kept on the surface between growing seasons. Varying the depth of plowing and growing deep-rooted plants help prevent the formation of hardened layers or plowsoles. A suitable cropping system is one in which grass is grown for 6 years and a row crop, such as corn, arranged in alternating parallel strips and planted on the contour, is grown for 2 years.

All crops respond to moderately large or large applications of fertilizer. A complete fertilizer should be applied near the date of planting.

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Additional fertilizer is needed from time to time and should be applied according to crop needs and soil tests. Legumes need nitrogen only at planting time to insure better inoculation. On long slopes surface runoff can be controlled by contour cultivation, terraces, vegetated waterways, stripcropping, and suitable cropping systems. Because the moisture supply is normally low late in summer or early in fall, late-maturing crops are not so well suited as early maturing crops.

Capability Unit IVe-2

The only soil in this unit is Fannin sandy clay loam, 6 to 10 percent slopes, eroded. This is a well-drained, moderately deep to deep soil. The subsoil is chiefly friable clay loam. Depth to bedrock is more than 7 feet.

The infiltration rate is medium, permeability is moderate, and the available water capacity is medium. This soil is workable. It is strongly acid. Natural fertility is low.

Most of the acreage is wooded. The rest is used mainly for pasture, and only small scattered areas are cultivated. Many of the pastures are unimproved. Corn and truck crops are the principal crops. Tall fescue is the most common pasture plant. This soil is moderately well suited to corn and grain sorghum. It is well suited to small grain and truck crops and to most of the hay and pasture grasses. Tall fescue grows well, and orchardgrass and white clover can be grown with good management.

Erosion is a moderately severe to severe hazard on this soil. Because of slope and past erosion, measures for controlling erosion are limited where this soil is cultivated. The most efficient measure is contour stripcropping. An example of a suitable cropping system is one in which grass is grown for 3 years and a row crop, such as corn, arranged in alternating strips, is grown for 1 year. This system will help control soil and water losses and help maintain good tilth and productivity. The soil is deficient in nitrogen, phosphorous, potassium, and calcium. The utilization of fertilizer by plants is in response to the available moisture, which is generally good in the spring and early in summer.

Cultivation is possible only within a fairly narrow range of moisture content. This soil is susceptible to clodding and puddling if it is plowed when too dry or too wet, because of the moderately fine textured surface layer. To maintain productivity and to reduce soil losses, all cultivation should be on the contour. Natural waterways must be kept in sod to safely remove excess runoff.

Capability Unit IVw-1

The only soils in this unit are Wehadkee soils. These are deep, poorly drained, alluvial soils on flood plains. They are nearly level and are flooded frequently. The surface layer is mottled silt loam, fine sandy loam, or clay loam. Below the surface layer is mainly mottled sandy clay loam, together with stratified layers of sandy loam and loamy sand. The strong mottling and the grayish color indicate that the soils are saturated with water for long periods of time.

The infiltration rate is slow to medium, permeability is moderate, and the available water capacity is medium. Natural fertility is low. These soils are medium acid to strongly acid. The root zone is shallow because of the high water table, unless the soils are drained. The soils are difficult to work.

Most of the acreage is forested to water-tolerant hardwoods. About 25 percent of the acreage is pastured. Native grasses and tall fescue are the most common grasses. These soils are suited to only a few kinds of crops and pasture plants. The most suitable crops are those that can tolerate excessive wetness, such as tall fescue, dallisgrass, white clover, and annual lespedeza.

Frequent stream flooding and excess water are the principal hazards. Some areas can be drained where stream channels can be used for satisfactory outlets. Lime and a complete fertilizer are needed. Plants respond moderately well to fertilization but show little growth when the soils are wettest late in winter and early in spring.

Capability Unit VIe-1

This unit consists of well-drained soils on uplands. These soils have slopes of 10 to 25 percent and are slightly to severely eroded. The surface layer ranges from fine sandy loam to clay loam and is gravelly in some places. The subsoil is moderately fine textured to fine textured but is dominantly clay loam. The depth to bedrock ranges from 4 feet to more than 6 feet.

The infiltration rate is moderately slow in the severely eroded, moderately steep soils and is medium in the slightly eroded soils. Permeability is moderate to moderately rapid, and the available water capacity ranges from medium to low. The content of available moisture is higher near the foot of slopes. These soils have a moderately deep to deep root zone and are low to moderate in natural fertility. They are strongly acid to slightly acid.

About half of the acreage has remained in woods. About 65 percent of the previously cultivated acreage has been reforested, mainly to Virginia and shortleaf pines. The cleared acreage is used mainly for pasture, but a very small acreage is used for corn and hay crops.

Erosion is a very severe hazard because of slope. Therefore, these soils are not suited to row crops. Good pastures can be established and maintained with good management. All of the common grasses and legumes can be grown, including tall fescue, coastal bermudagrass, common bermudagrass, orchardgrass, annual lespedeza, sericea lespedeza, and white clover.

These soils need lime and moderate applications of a complete fertilizer. They should not be plowed, except for the reseeding of pasture. All plowing should be on the contour, and long slopes should not be planted their entire length. Runoff accumulates

rapidly and sometimes destroys newly established pasture stands. Stands can best be established by seeding alternate contour strips over a period of time. Grazing should be carefully controlled.

Capability Unit VIe-2

This unit consists of deep, well-drained to somewhat poorly drained soils that occur on uplands, around drainheads, and at the foot of some slopes. Slopes are 6 to 15 percent. Much of the acreage shows little to no erosion, but some of it is severely eroded. Most of the severely eroded areas have a sandy clay loam surface layer. The surface layer in slightly eroded areas is fine sandy loam. The subsoil is dominantly sandy clay loam, but in places it is clay loam. Depth to hard rock ranges from 6 to more than 20 feet.

The infiltration rate is medium in the soils that are slightly to moderately eroded and moderately slow in the severely eroded soils. The available water capacity is medium. These soils are low in natural fertility, are strongly acid, and have a moderately shallow to deep root zone.

Most of the acreage is forested. The severely eroded areas are reforested mainly to Virginia and shortleaf pines. Most of the cleared acreage is used for pasture, much of which is not improved. Some small fields are used for corn, truck crops, and hay. Tall fescue, native grasses, and lespedeza are the most common pasture plants.

The erosion hazard is moderate to severe. Because of this hazard, the soils are not suited to row crops. They are suited to pasture and limited hay production. The better suited pasture and hay plants are sericea lespedeza, tall fescue, bermudagrass, and sod-seeded ryegrass.

Lime and moderate applications of a complete fertilizer are needed. These soils should not be plowed, except for seeding or reseeding of pasture or hay, and all plowing should be on the contour. Runoff accumulates rapidly, and newly established pasture is likely to be partly destroyed if an entire slope is prepared and seeded at one time. On long, steep slopes, pastures should be established by seeding alternate contour strips over a period of time. This practice will help to reduce the risk of erosion and of failure to get a stand established.

Capability Unit VIe-4

The only soil in this unit is Musella gravelly clay loam, 10 to 25 percent slopes, eroded. This is a well-drained soil on uplands. In most areas the surface layer is gravelly clay loam, but in some areas it is clay loam. The subsoil is dominantly gravelly clay loam. Depth to hard rock is generally 3 feet or more.

The infiltration rate is moderately slow to slow. Permeability is moderate, and the available water capacity is low. Natural fertility and content of organic matter are low. This soil is strongly acid and has a shallow to moderately shallow root zone.

Much of the acreage is forested, mainly with hardwoods. Most of the severely eroded areas, however, are reforested to Virginia and shortleaf pines. The cleared areas are mostly in unimproved pasture, but some small patches are used for truck crops. Native grasses, tall fescue, and lespedeza are the most common pasture plants.

The hazard of erosion is moderate to very severe. Because of this hazard and the low available water capacity, this soil is not suited to row crops and is only moderately well suited to hay and pasture. Grasses and legumes are somewhat difficult to establish and maintain. The better suited pasture and hay plants are tall fescue, sericea lespedeza, and sod-seeded ryegrass.

Lime and moderate applications of a complete fertilizer are needed. This soil should not be plowed, except for seeding and reseeding pasture or hay. All planting should be on the contour. Runoff accumulates rapidly, and newly established pasture is likely to be partially destroyed if an entire slope is planted at one time. On long steep slopes, pasture should be established by seeding alternate contour strips over a period of time. This will help to reduce the risk of failure to establish a good stand, as well as cut down the risk of erosion.

Capability Unit VIIe-1

In this unit are mainly well-drained soils on mountains and uplands. Slopes range from 15 to 80 percent. Most of the acreage shows little or no erosion. The surface layer is fine sandy loam to loam, and the subsoil is loam to clay. The depth to hard rock is 4 feet or more.

The infiltration rate is medium, permeability is moderate to moderately rapid, the available water capacity ranges from low to high. Upper slopes are slightly droughty, but available moisture increases on the lower slopes. These soils range from low to high in natural fertility, are strongly acid to slightly acid, and have a moderately deep to deep root zone.

About 90 percent of the acreage is forested, mostly to hardwoods but partly to pine. Most of the eroded areas have been reforested, mainly to Virginia and shortleaf pines. A few small areas are pastured. Native grasses, tall fescue, and lespedeza are the most common pasture plants. These soils are too steep for cultivated crops or good pasture. Soils that are pastured are subject to erosion, are not very productive, and are difficult to fertilize and to mow because of steep slopes. The best use of these soils is forest.

Capability Unit VIIe-2

This unit consists of well-drained to somewhat excessively drained soils of the uplands and

intermountains. These soils have slopes of 25 to 70 percent. Most of the soils are uneroded, but a few areas are eroded. In most areas the surface layer is loam and cobbly loam. Most areas have a loam to clay loam subsoil containing many schist fragments. Depth to hard rock is 3 feet or more.

The infiltration rate is medium, and permeability is moderate to moderately rapid. The available water capacity is low. The narrow ridgetops and upper slopes are slightly droughty, but moisture is more plentiful on the lower slopes. These soils are low in natural fertility and organic-matter content, are strongly acid, and have a shallow to deep root zone.

Most of the acreage is forested, mainly to Virginia and shortleaf pines and hardwoods. A few small areas are pastured. Native grasses and lespedeza are the most common pasture plants, but a few small areas are in tall fescue. These soils are too steep and too droughty for cultivated crops or pasture. Soils that are pastured are subject to erosion, are not productive, and are difficult to fertilize and to mow because of steep slopes. The best use for these soils is forest.

Capability Unit VIIe-4

This unit consists of Gullied land, a miscellaneous land type. More than half of the land surface is cut by deep or shallow gullies. Many of the gullies have penetrated into the weathered rock, especially where hydraulic mining operations were carried on.

The infiltration rate is low, and the available water capacity is low. Runoff is rapid. Gullied land is low in natural fertility and contains little organic matter. It is not workable, and most areas have shallow to very shallow root zones.

The total acreage in the survey area is very small, and all of it is wooded. Because of the very severe erosion hazard, numerous gullies, mine shafts, and pits, this land is not suited to cultivated crops and pasture. It can be used for woodland, but establishing any type of vegetation requires great skill, care, and patience.

Capability Unit VIIs-1

This unit consists of well-drained to excessively drained, stony and cobbly soils on mountains, uplands, and valley floors. The slopes range from 10 to 90 percent but are generally between 25 and 60 percent. The depth to hard rock is 2 to more than 5 feet. These soils are loamy, but there are numerous cobblestones and stones throughout the soil profile.

The infiltration rate is medium to rapid. Runoff is moderate to very rapid. These soils have a shallow to deep root zone. The available water capacity is high to low; it varies according to the volume of coarse fragments in the soil material and the depth to hard rock. These soils are not suited to crops or pasture, and in most places the acreage is forested, mainly with hardwoods; there are a few pine and spruce trees.

Capability Unit VIIIs-1

This unit consists only of Rock land, a miscellaneous land type that has rock outcrops covering more than half of the acreage. In the remaining acreage, the soil material is coarse textured. Generally, plants cannot grow on Rock land, but the areas can be managed to provide a small amount of food and cover for wildlife. Some of the areas can also be developed for recreation.

Estimated Yields

Estimated average acre yields of the principal crops grown on the soils in Dawson, Lumpkin, and White Counties are given in table 2. These are estimates of yields that might be expected during an average year or estimates of yields averaged over a 10-year period. Larger yields can be expected during years when rainfall and temperature are favorable and when there is little damage from insect infestation. Smaller yields are to be expected when prolonged drought occurs, when temperatures are unseasonably low, and when damage from insect infestation is extensive.

The yields that can be expected under good management are indicated in the response of the soils to management. It does not reflect yields that can be expected on irrigated soils or on soils in experimental plots.

Generally, the management needed to obtain the yields listed in table 2 includes: choosing suitable varieties of crops; preparing a good seedbed; using proper planting methods; inoculating legume seeds; seeding at recommended rates and at proper times; controlling weeds; draining soils in which excess water interferes with plant growth or cultivation; using the soils according to suggestions given in the capability unit section of this survey; liming as required; and applying phosphate, potash, and nitrogen in amounts given in this survey.

Most soils have some characteristics that limit yields. Some of these are natural limitations and some, such as erosion and compaction, are man made. Some soils have more limitations than others. The yields in table 2 reflect some of the limitations of soils. In addition, special practices needed to obtain estimated yields for particular crops are as follows:

Corn and grain sorghum. The soils used for corn or grain sorghum receive, per acre, 70 to 100 pounds of nitrogen and 60 to 70 pounds each of phosphoric acid and potash. The crop is seeded at a rate that provides 10,000 to 15,000 plants per acre. All crop residue is turned under, and winter cover crops are turned under.

Oats, barley, and wheat. At planting time the soils used for oats, barley, or wheat receive, per acre, 16 to 24 pounds of nitrogen and 48 to 72 pounds each of phosphoric acid and potash. An additional 32 to 64 pounds of nitrogen is applied late in winter. The planting rate, per acre, is 3 to 4 bushels of oats, 2 bushels of barley, or 2 bushels of wheat.

Sericea lespedeza. At seeding time the soils used for sericea lespedeza receive, per acre, 16 to 24 pounds of nitrogen, 48 to 72 pounds each of phosphoric acid and potash, and 1 ton of lime. An additional 48 to 72 pounds each of phosphoric acid and potash is applied annually, and an additional 1 ton of lime is applied at least once in 3 years, or lime is applied according to the needs indicated by soil tests.

Coastal bermudagrass. At planting time the soils used for Coastal bermudagrass receive, per acre, 30 to 120 pounds of nitrogen and 60 to 120 pounds each of phosphoric acid and potash. When the grass is 2 to 3 inches high, the soils are topdressed with an additional 33 pounds of nitrogen. Thereafter, they receive 100 to 200 pounds of nitrogen, 40 to 60 pounds of phosphoric acid, and 60 to 90 pounds of potash per acre annually, and lime is applied every 3 years in amounts indicated by soil tests. The planting rate is 14,000 stolons per acre or 10 to 15 pounds of seed per acre. The seedbed is well prepared.

Tall fescue and white clover. The soils used for tall fescue and white clover receive, per acre, 32 to 96 pounds of nitrogen, the amount depending on the effectiveness of the clover in furnishing nitrogen to the grass, and 48 to 96 pounds each of phosphoric acid and potash. In addition, lime is applied at a rate of 1 ton per acre, or lime is used according to needs indicated by soil tests. The planting rate, per acre, is 10 to 15 pounds of tall fescue and 1 to 3 pounds of white clover. At regular intervals the stand is mowed to control excessive growth and weeds.

TABLE 2.--ESTIMATED AVERAGE ACRE YIELDS OF THE PRINCIPAL CROPS GROWN UNDER

[Absence of a yield figure indicates that

Soil	Corn	Grain sorghum	Oats	Barley	Wheat
	Bu.	Bu.	Bu.	Bu.	Bu.
Appling sandy loam, 6 to 10 percent slopes, eroded	65	45	65	38	38
Ashe and Edneyville stony loams, 10 to 25 percent slopes	--	--	--	--	--
Ashe and Edneyville stony loams, 25 to 60 percent slopes	--	--	--	--	--
Ashe stony loam, 60 to 90 percent slopes	--	--	--	--	--
Augusta fine sandy loam, 2 to 6 percent slopes	65	45	55	35	32
Augusta fine sandy loam, 6 to 10 percent slopes	50	35	40	27	30
Buncombe loamy sand	45	31	45	27	--
Burton loam, 15 to 50 percent slopes	--	--	--	--	--
Cartecay complex	85	85	--	--	--
Chandler loam, 25 to 60 percent slopes	--	--	--	--	--
Congaree and Starr soils	90	63	75	45	40
Edneyville and Porters loams, 10 to 15 percent slopes	65	32	45	32	27
Edneyville and Porters loams, 15 to 25 percent slopes	50	25	35	23	20
Edneyville and Porters loams, 25 to 60 percent slopes	--	--	--	--	--
Edneyville and Porters loams, 60 to 80 percent slopes	--	--	--	--	--
Fannin fine sandy loam, 2 to 6 percent slopes	80	56	65	40	38
Fannin fine sandy loam, 6 to 10 percent slopes	70	49	57	35	34
Fannin fine sandy loam, 10 to 25 percent slopes	59	32	55	32	26
Fannin sandy clay loam, 6 to 10 percent slopes, eroded	55	31	40	30	25
Fannin sandy clay loam, 10 to 25 percent slopes, eroded	30	20	25	18	15
Fannin soils, 25 to 60 percent slopes	--	--	--	--	--
Gullied land	--	--	--	--	--
Hayesville sandy loam, 2 to 6 percent slopes	80	56	65	40	38
Hayesville sandy loam, 6 to 10 percent slopes	70	49	57	35	34
Hayesville sandy loam, 10 to 25 percent slopes	59	42	47	29	26
Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded	55	38	40	25	25
Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded	30	20	25	18	15
Hayesville and Rabun loams, 6 to 10 percent slopes	75	48	63	38	37
Hayesville and Rabun loams, 10 to 15 percent slopes	60	35	57	34	30
Hayesville and Rabun loams, 25 to 60 percent slopes	--	--	--	--	--
Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded	50	34	38	23	22
Hiwassee loam, 2 to 10 percent slopes	80	56	66	40	38
Hiwassee loam, 10 to 15 percent slopes	73	47	57	30	30
Hiwassee loam, 15 to 40 percent slopes	55	38	40	23	24
Masada fine sandy loam, 2 to 6 percent slopes	73	51	75	40	45
Masada fine sandy loam, 2 to 6 percent slopes, eroded	68	47	70	38	42
Masada fine sandy loam, 6 to 10 percent slopes, eroded	60	42	60	35	36

See footnote at end of table.

AN IMPROVED LEVEL OF MANAGEMENT THAT DOES NOT INCLUDE IRRIGATION

the crop is not commonly grown on the soil]

Hay			Pasture	
Sericea lespedeza	Coastal bermudagrass	Tall fescue and clover	Coastal bermudagrass	Tall fescue and white clover
Tons	Tons	Tons	Animal-unit-months 1/	Animal-unit-months 1/
2.9	5.0	3.5	8.3	5.8
---	---	.7	---	1.0
---	---	---	---	---
---	---	---	---	---
---	---	3.6	---	6.0
---	---	3.4	---	5.7
1.7	3.8	---	6.3	---
---	---	3.5	---	5.8
---	---	4.0	---	6.7
---	---	2.0	---	2.3
3.1	5.0	4.2	8.3	7.0
2.5	2.7	1.8	4.3	3.3
2.5	2.2	1.4	3.6	2.5
---	---	---	---	---
---	---	---	---	---
3.0	4.0	3.2	6.7	6.0
3.0	3.8	3.1	6.3	5.5
2.5	3.6	2.4	5.5	6.0
2.1	3.0	1.8	5.3	4.7
1.4	2.7	1.6	4.0	3.0
---	---	---	---	---
---	---	---	---	---
3.0	4.0	3.2	6.7	6.0
3.0	3.8	3.1	6.3	5.5
2.5	3.6	2.4	5.5	5.0
3.0	3.4	1.8	5.7	4.7
1.4	2.7	1.6	4.0	3.0
2.9	4.0	3.1	6.1	5.3
2.6	3.6	2.6	5.8	5.0
---	---	---	---	---
2.8	3.3	2.0	5.5	4.5
3.0	5.1	3.6	7.5	5.8
2.8	4.5	2.6	7.3	5.4
2.5	4.0	2.2	6.6	4.8
2.5	3.8	3.7	6.3	6.2
3.0	3.6	3.6	6.2	6.0
2.5	3.4	3.1	5.7	5.2

TABLE 2.--ESTIMATED AVERAGE ACRE YIELDS OF THE PRINCIPAL CROPS GROWN UNDER AN

Soil	Corn	Grain sorghum	Oats	Barley	Wheat
	Bu.	Bu.	Bu.	Bu.	Bu.
Masada fine sandy loam, 10 to 15 percent slopes, eroded	55	38	58	32	34
Musella cobbly loam, 6 to 25 percent slopes	25	18	35	20	20
Musella cobbly loam, 25 to 70 percent slopes	--	--	--	--	--
Musella gravelly clay loam, 10 to 25 percent slopes, eroded	--	--	--	--	--
Rabun loam, 15 to 25 percent slopes	65	45	50	25	26
Rabun clay loam, 10 to 15 percent slopes, severely eroded	50	34	40	20	20
Rabun clay loam, 15 to 25 percent slopes, severely eroded	--	--	--	--	--
Rock land	--	--	--	--	--
Starr fine sandy loam	90	60	70	40	40
Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes	--	--	--	--	--
Tallapoosa fine sandy loam, 10 to 25 percent slopes	--	--	--	--	--
Tallapoosa soils, 25 to 70 percent slopes	--	--	--	--	--
Toccoa soils	90	63	75	45	--
Tusquitee loam, 6 to 10 percent slopes	88	62	65	40	37
Tusquitee loam, 10 to 25 percent slopes	78	57	50	30	30
Tusquitee loam, 25 to 60 percent slopes	--	--	--	--	--
Tusquitee stony loam, 10 to 25 percent slopes	--	--	--	--	--
Tusquitee stony loam, 25 to 60 percent slopes	--	--	--	--	--
Wehadkee soils	46	30	--	--	--
Wickham fine sandy loam, 6 to 10 percent slopes	70	45	50	30	30
Wickham fine sandy loam, 10 to 25 percent slopes	55	35	36	32	22
Wickham fine sandy loam, 25 to 50 percent slopes	--	--	--	--	--
Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded	--	--	--	--	--

1/ Animal-unit-months is a term used to express the carrying capacity of pasture. It is the number of months that 1 acre will provide grazing for 1 animal (1,000 pounds live weight), or the number of months the pasture can be grazed multiplied by the number of animal units an acre will support.

IMPROVED LEVEL OF MANAGEMENT THAT DOES NOT INCLUDE IRRIGATION--Continued

Hay			Pasture	
Sericea lespedeza	Coastal bermudagrass	Tall fescue and clover	Coastal bermudagrass	Tall fescue and white clover
Tons	Tons	Tons	Animal-unit-months 1/	Animal-unit-months 1/
2.5	3.4	3.1	5.4	4.8
1.8	---	2.6	---	4.3
---	---	---	---	---
1.5	---	2.3	---	4.0
2.5	3.5	2.4	6.7	5.0
2.5	3.5	2.4	5.8	4.3
---	---	2.0	---	3.7
---	---	---	---	---
3.0	4.5	3.0	7.5	6.7
---	---	---	---	2.2
---	---	---	---	3.0
---	---	---	---	---
3.0	4.5	4.2	7.5	7.0
3.8	4.2	4.1	7.0	6.5
3.0	4.0	3.8	6.7	6.0
2.0	---	---	5.5	4.3
---	---	---	2.9	2.7
---	---	---	---	---
---	---	2.5	---	5.4
2.9	4.6	2.0	7.4	5.4
2.2	4.2	2.5	6.7	4.3
---	---	1.5	4.9	3.7
2.0	3.0	1.7	5.2	4.0

USE OF THE SOILS FOR WOODLAND[2/]

In 1963, about 88.6 percent of the total land area in Dawson, Lumpkin, and White Counties was in commercial forest. Of the total wooded acreage, 26.4 percent was in National Forest and other public ownership. Private and industrial ownership made up the remaining 73.6 percent (8).

The forest survey also shows that in the three-county area, 42.4 percent of the total forest land is in softwoods, such as yellow pine, white pine, and hemlock. The remaining 57.6 percent is in hardwoods, mainly oak and yellow-poplar, together with smaller amounts of hickory, gum, and maple. Local markets for sawtimber and veneer are more than adequate for the current annual growth.

Markets for softwood pulp also exist. Except in the southern half of these counties, however, the long truck haul to the railroad limits profits to be gained from the sale of this pulpwood. The market for hardwood pulp is limited to the extreme southeastern part of White County. Adequate forest fire protection provided to all lands in the past few years has increased the interest in good forestry and has raised the standards for forestry practice.

Woodland Suitability Groups

In table 3 the soils of the survey area have been placed in 14 woodland suitability groups. Each group consists of soils that have about the same suitability for trees, require about the same management, and have about the same potential productivity. The names of soil series represented are mentioned in the description of each group, but this does not necessarily mean that all the soils of a given series appear in the group. The "Guide to Mapping Units" at the back of the survey lists the soils in the three counties and gives the woodland suitability group for each. Not placed in a woodland group are Gullied land and Rock land, because these miscellaneous land types are not suited to trees.

Table 3 lists, in order of preference, the commerically important trees that were sampled on the soils of each woodland group in the survey area. The potential productivity of these trees is expressed as the prevailing site index, which is the total height, in feet, that the most desirable (dominant and codominant) trees of a given species, growing on a specified soil, will reach in 50 years. The estimates of site indexes given are based on measurements of trees of different species, on published and unpublished records, and on measurements taken by technicians working with wood crops in the three counties.

Optimum annual growth (shown in table 3) varies with both the species and the site index. To gain the greatest volume of either pulpwood or sawtimber, the stand should be harvested at the indicated age and a new crop planted. In the case of sawtimber, particularly hardwoods, quality timber produced by larger trees commands higher stumpage prices. If this is the case, stands on sites where the site index is above 80 may be left for 10 to 30 years longer to take advantage of this economic increase. This situation is most common in cove hardwood sites (woodland suitability groups 1, 7, and 8).

Equipment limitations are rated according to the degree that some soil characteristics and topographic features restrict or prohibit the use of conventional equipment for preparing sites, planting and harvesting wood crops, constructing roads, controlling unwanted vegetation, and controlling fires. The limitation is slight if there is little or no restriction on the type of equipment that can be used, or on the time of the year that the equipment can be used. It is moderate if the use of equipment is restricted by one or more unfavorable characteristics, such as slope, stones or other obstructions, seasonal wetness, instability, or risk of injury to roots of trees. The limitation is severe if special equipment is needed, and if the use of such equipment is severely restricted by one or more unfavorable soil characteristics.

Seedling mortality refers to the expected loss of seedlings as a result of unfavorable soil characteristics or topographic features, but not as a result of plant competition. Even if healthy seedlings of a suitable species are correctly planted or occur naturally in adequate numbers, some will not survive if conditions are unfavorable. Mortality is slight if less than 25 percent of the planted seedlings is lost, moderate if 25 to 50 percent is lost, and severe if more than 50 percent is lost.

Plant competition refers to the rate of invasion by undesirable trees, shrubs, and vines when an opening is made in the canopy. Competition is slight if it does not prevent adequate natural regeneration and early growth of desirable trees or interfere with the normal development of planted seedlings. Competition is moderate if it delays natural or artificial regeneration, slows the growth of seedlings, but does not prevent the eventual development of a fully stocked, normal stand. Competition is severe if it prevents adequate natural or artificial regeneration without intensive site preparation and without special maintenance practices, such as weeding.

Potential erosion hazard refers to the degree of limitation placed on the production of wood crops as a result of potential erosion if the soils are used as woodland and if the soils are managed according to the current acceptable standards. The hazard is considered slight if the problems of erosion control are not great. It is moderate if some attention must be given to controlling erosion.

[2/] This section was prepared by ROBERT G. RAYMOND, branch chief, Timber Management Planning and Inventory, Southern Region, U.S. Forest Service; GEORGE HOFFMAN, timber management staff, National Forests in Georgia, USFS; and T. W. GREEN, soil scientist, USFS.

The hazard is severe if intensive managment, special equipment, and special methods of operation must be planned to protect the soils.

Species suitability refers to the kinds of trees that should be favored in managing existing stands, and also to trees that should be used for planting. Preferred indicates those species to be planted, encouraged in natural regeneration, and managed in existing stands. Acceptable species are those species tolerated in mixtures with preferred species.

Woodland Suitability Group 1

In this group are deep, excessively drained and well-drained soils of the Buncombe, Congaree, Starr, and Toccoa series. These soils occur on narrow flood plains, on low terraces, and in upland depressions. The texture ranges from loamy sand to sandy clay loam. The equipment limitation is slight, except in winter months when the soils become saturated and are sometimes flooded for short periods. These soils are suited to hardwood production.

Woodland Suitability Group 2

This group consists of somewhat poorly drained and poorly drained soils of the Augusta, Cartecay, and Wehadkee series. These soils lie on narrow stream bottoms, on low terraces, in upland depressions, and around heads of drains. The texture ranges from fine sandy loam to sandy clay loam throughout the profile. In places there are included small areas of stratified soils. The water table on the lower sites is within 6 to 12 inches of the surface about 6 months of the year. The higher sites are only slightly better drained. This wetness restricts the use of equipment for short periods. Soils in this group are hardwood sites.

Woodland Suitability Group 3

This group consists of deep, well-drained, highly productive soils of the Masada and Wickham series. These soils occupy stream terraces and foot slopes. Slopes range from 2 to 25 percent. The surface layer is fine sandy loam except in eroded areas, where it is slightly finer textured. The subsoil is moderately permeable sandy clay loam or clay loam. Hazards and limitations affecting management are generally slight, though plant competition is moderate. These soils are productive of both hardwoods and pines, but hardwoods are better suited.

Woodland Suitability Group 4

In this group are mainly moderately shallow, stony, well-drained to excessively drained soils of the Ashe and Edneyville series. These soils have a sandy loam surface layer over a loam and clay loam subsoil. They occupy side slopes that lie at elevations of 2,500 to 4,500 feet and generally have a southerly aspect. Slopes range from 25 to 90 percent. In places rock is exposed. Where these soils adjoin the Porters and other associated soils, there is a slight increase in clay content in the subsoil. Equipment limitations are severe because of stoniness and steep slopes. The lack of adequate moisture causes moderate seedling mortality. Soils of this group are well suited as sites for mixed pines and oaks.

Woodland Suitability Group 5

This group consists mainly of moderately deep, well-drained soils of the Ashe, Edneyville, and Porters series. These soils have a sandy loam or stony sandy loam surface layer over a sandy clay loam or loam subsoil. They generally occur on narrow ridges at elevations of 3,000 to 4,500 feet. The slopes range from 10 to 25 percent. Small areas of exposed bedrock occur in some places. Stoniness and steep slopes are moderately limitations affecting use of equipment. Ice damage is common along the higher ridges. Soils of this group are suitable as sites for mixed stands of oak and pine.

Woodland Suitability Group 6

This group is made up of moderately deep, well-drained soils of the Edneyville and Porters series. These soils have a loamy surface layer over a sandy clay loam, clay loam, and silty clay loam subsoil. They occur on side slopes that generally have a northerly aspect and in most places lie at elevations of 2,500 to 4,500 feet. Slopes range mainly from 25 to 60 percent, but in places they are as much as 80 percent. Small areas of stony soils are included. Equipment limitations are severe because of steep slopes. Laurel and rhododendron "slicks" are common. Soils of this group are well suited to use for hardwood production.

Woodland Suitability Group 7

In this group are deep, well-drained, highly productive soils of the Burton, Tusquitee, and Wickham series. These soils occur in coves, in saddles, along drainageways, and on foot slopes. Generally, they have a moderately thick loam or stony loam surface layer over a loam and sandy clay loam subsoil. The average depth of these soils is between 6 and 10 feet, though depth ranges from 4 to 20 feet. Slopes range from 6 to 60 percent, but in most places slopes are 15 to 45 percent. Some areas of moderately deep soils are included. The Burton soils in this group are the most productive soils for wood crops in the survey area, but their acreage is limited. Stoniness and steep slopes are moderate limitations that affect use of equipment. Soils of this group are better suited to hardwoods than to pines.

Woodland groups and soils	Commercially important trees sampled	Potential productivity				
		Prevailing site index 1/	Optimum annual growth 2/			
			Cubic feet 3/	Age 4/	Board feet 3/	Age 4/
				Years		Years
Group 1:						
Deep, highly productive, mainly well-drained soils on narrow flood plains, on low stream terraces, and in upland depressions. (Bfs, Con, Sta, Toc.)	Yellow-poplar	110+	---	--	441	60
	Red oak	80+	69	60	261	100
	White oak	80+	80	60	320	100
Group 2:						
Highly productive soils that have moderate to severe limitations because of a high water table (water table is within 6 to 12 inches of the surface about 6 months each year). Soils are subject to frequent flooding. (AwB, AwC, Cac, Wed.)	Yellow-poplar	100	---	--	316	60
	Red oak	70	58	60	199	100
	White oak	70	69	60	261	100
Group 3:						
Mainly nearly level to sloping, highly productive soils on stream terraces and on foot slopes. (MoB, MoB2, MoC2, MoD2, WgC, WgD.)	Yellow-poplar	100	---	--	316	60
	Red oak	80	69	60	261	100
	White oak	70	69	60	261	100
Group 4:						
Mainly moderately shallow, stony soils that lie at an elevation of 2,500 to 4,500 feet and generally have a southerly aspect. (AcG, AEF.)	Shortleaf pine	60	105	40	282	80
	White pine	80	---	--	550	100
	Virginia pine	70	109	40	453	40
Group 5:						
Mainly moderately deep soils that occur on narrow, undulating ridges at an elevation of 3,000 to 4,500 feet. (AEE, EPD, EPE.)	Red oak	70	58	60	199	100
	White oak	60	47	70	137	100
	White pine	80	---	--	550	100
Group 6:						
Mainly moderately deep, steep to very steep soils that lie at an elevation of about 2,500 to 4,500 feet and generally have a northerly aspect. (EPF, EPG.)	Red oak	70	58	60	199	100
	White oak	70	69	60	261	100
	Yellow-poplar	90	---	--	222	60

See footnotes at end of table.

RATINGS OF MAJOR LIMITATIONS AND HAZARDS AFFECTING MANAGEMENT

Equipment limitation	Seedling mortality	Plant competition	Potential erosion hazard	Species suitability	
				Preferred 5/	Acceptable or secondary species 6/
Slight	Slight	Moderate	Slight	Yellow-poplar, northern red oak, white oak, black oak, sweetgum.	White pine, shortleaf pine.
Severe	Moderate to severe.	Moderate to severe.	Slight	Yellow-poplar, black oak, sweetgum.	Loblolly pine, shortleaf pine.
Slight	Slight	Moderate	Moderate	Yellow-poplar, black oak.	White pine, shortleaf pine.
Severe	Moderate	Slight	Severe	Pitch pine, chestnut oak, shortleaf pine (lower elevations).	Scarlet oak, black oak.
Moderate	Moderate	Slight	Moderate	Black oak, pitch pine	Chestnut oak.
Severe	Moderate	Severe	Severe	Northern red oak, white oak, yellow-poplar.	White pine, black oak.

TABLE 3.--WOODLAND GROUPS, THEIR POTENTIAL PRODUCTIVITY, AND RATINGS

Woodland groups and soils	Commercially important trees sampled	Potential productivity				
		Prevailing site index 1/	Optimum annual growth 2/			
			Cubic feet 3/	Age 4/	Board feet 3/	Age 4/
				Years		Years
Group 7:						
Deep, highly productive, well-drained soils that lie in coves, in saddles, along drainageways, and on foot slopes. Average soil depth is 6 to 10 feet with ranges of 4 to 20 feet. (BvF, T1C, T1D, T1F, TmE, TmF, WgF.)	Yellow-poplar----	110+	---	--	441	60
	Red oak----------	80+	69	60	261	100
	White oak--------	80+	80	60	320	100
Group 8:						
Deep, highly productive, well-drained soils that lie in coves, in saddles, and on foot slopes. The soils developed in basic clayey soil material. Average soil depth is 6 to 10 feet with ranges of 4 to 20 feet. (HSC, HSD, HSF.)	Yellow-poplar----	110	---	--	441	60
	Red oak----------	80	69	60	261	100
	White oak--------	80	80	60	320	100
Group 9:						
Moderately deep to deep, gently sloping to steep soils about 20 to 40 inches thick, formed in basic soil materials that occur on uplands at elevations of about 1,200 to 2,800 feet. (HLC, HLD, HLF, RaE.)	Shortleaf pine----	70	105	40	282	80
	Red oak----------	70	58	60	197	100
Group 10:						
Cobbly soils about 6 to 20 inches thick that were formed in basic soil material and that lie at an elevation of 1,500 to 3,000 feet. Fractured bedrock is exposed in some places. Cobblestones are angular. (MCE, MCG.)	Virginia pine----	60	90	40	391	50
	Shortleaf pine---	60	105	40	393	70
	Red oak----------	60	47	70	137	100
Group 11:						
Mainly moderately deep, well-drained soils that were formed from gneiss and schist. These soils occur on ridges and slopes at an elevation of 1,200 to 3,000 feet. (AmC2, H1B, H1C, H1E.)	Shortleaf pine----	80	153	40	515	60
	Red oak----------	70	58	60	199	100
	White oak--------	70	69	60	261	100

Equipment limitation	Seedling mortality	Plant competition	Potential erosion hazard	Species suitability	
				Preferred 5/	Acceptable or secondary species 6/
Moderate-----	Slight-------	Slight------	Moderate-----	Yellow-poplar, northern red oak, white oak.	White pine, shortleaf pine (lower elevations), black oak, scarlet oak.
Severe-------	Slight-------	Slight------	Severe-------	Yellow-poplar, northern red oak, white oak, black oak.	White pine.
Moderate to severe.	Slight-------	Moderate----	Moderate to severe.	Shortleaf pine, black oak, southern red oak, loblolly pine (lower elevations).	White oak.
Severe-------	Slight-------	Moderate----	Severe-------	Virginia pine----------	Red oak, shortleaf pine.
Slight to moderate.	Slight-------	Moderate----	Moderate-----	Shortleaf pine, southern red oak, loblolly pine (lower elevations).	Virginia pine, white oak.

TABLE 3.--WOODLAND GROUPS, THEIR POTENITAL PRODUCTIVITY, AND RATINGS

Woodland groups and soils	Commercially important trees sampled	Potential productivity				
		Prevailing site index 1/	Optimum annual growth 2/			
			Cubic feet 3/	Age 4/	Board feet 3/	Age 4/
				Years		Years
Group 12:						
Mainly shallow, micaceous soils that lie on ridges and slopes at an elevation of 1,200 to 3,000 feet and generally have a southerly aspect. (CCF, TbE, TcE, TdG.)	Shortleaf pine----	70	130	40	393	70
	Virginia pine-----	70	109	40	463	40
	White pine--------	80	---	--	550	100
Group 13:						
Moderately deep, micaceous soils that lie on ridges and slopes at an elevation of 1,200 to 3,000 feet and generally have a southerly aspect. (FaB, FaC, FaE.)	Shortleaf pine----	80	153	40	515	60
	Red oak----------	70	58	60	199	100
	White oak---------	60	47	70	137	100
Group 14:						
Mainly moderately deep soils that have a moderately fine textured surface layer. This group also includes severely eroded soils. (FbC2, FbE2, FcF, JHC3, HKC3, MuE2, RbD3, RbE3, WnD3).	Virginia pine-----	80	123	40	529	40
	Shortleaf pine----	70	130	40	393	70

1/ Dashed lines indicate that species listed is not harvested for pulpwood on soils of this woodland group.

2/ Prevailing site index is the site index that is common to Dawson, Lumpkin, and White Counties.

3/ Based on data in USDA Misc. Pub. 50 (12); USDA Tech. Bul. 560 (5); North Carolina Agr. Exp. Sta. Tech. Bul. 100 (4); USDA Bul. 13 (2); and Yellow-poplar Board Foot Yield Table, U.S. Forest Service, Southeastern For. Exp. Sta., unpublished.

OF MAJOR LIMITATIONS AND HAZARDS AFFECTING MANAGEMENT--Continued

Equipment limitation	Seedling mortality	Plant competition	Potential erosion hazard	Species suitability	
				Preferred 5/	Acceptable or secondary species 6/
Severe--------	Moderate-----	Slight------	Severe--------	Shortleaf pine, pitch pine (higher elevations).	Chestnut oak, Virginia pine, southern red oak (lower elevations).
Slight to moderate.	Slight-------	Slight------	Moderate------	Shortleaf pine, loblolly pine (lower elevations).	Southern red oak, black oak, white oak.
Severe--------	Moderate to severe.	Slight------	Severe--------	Virginia pine, shortleaf pine.	

4/ This is the age at which average annual volume growth begins to decline. See "Optimum annual growth" in text for further explanation.

5/ Most desirable species to plant, to encourage in natural regeneration, or to manage in existing stands.

6/ Species that can be tolerated in mixtures with preferred species.

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Woodland Suitability Group 8

In this group are soils of the Hiwassee series. These are deep, well-drained, highly productive soils in coves, in saddles, and on foot slopes. They formed in basic, clayey soil material that came from surrounding ridges and slopes. These soils have a moderately thick loam surface layer over a sticky clay loam or clay subsoil. Average soil depth is between 6 and 10 feet, but depth ranges from 4 to more than 20 feet. Slopes range from 2 to 40 percent, but in most places they are 10 to 25 percent. Equipment limitations are mainly severe because of steep slopes and the clayey subsoil. Soils of this group are better suited to hardwoods than to pines.

Woodland Suitability Group 9

This group consists of moderately deep to deep, well-drained soils of the Hayesville and Rabun series. These soils occur on ridges and side slopes. Elevations range from 1,200 to 2,800 feet. The soils have a loam surface layer over a sticky clay loam or clay subsoil. They are generally associated with the horneblende gneiss, but small areas are scattered throughout the three counties. Slopes range from 6 to 60 percent but average between 10 and 25 percent. The equipment limitation is mainly severe on steep slopes during wet periods because of the sticky, clayey subsoil. Soils of this group are suitable as sites for mixed pines and oaks.

Woodland Suitability Group 10

This group consists of well-drained soils of the Musella series. These soils are on ridgetops and side slopes at elevations of 1,500 to 3,000 feet. They have a cobbly loam surface layer over a thin clay or clay loam subsoil. Slopes range from 6 to 70 percent but generally are 15 to 70 percent. Fractured bedrock is exposed in places. Steep slopes and the content of stones and cobblestones contribute to the severe equipment limitation on soils of this group. The erosion hazard is severe because of shallowness and steep slopes. The soils are suited to Virginia pine.

Woodland Suitability Group 11

In this group are mainly moderately deep, well-drained soils of the Appling and Hayesville series. These soils formed primarily in material from acid gneiss on ridges and side slopes at elevations of about 1,200 to 3,000 feet. Generally, they have a sandy loam surface layer over a clay loam to clay subsoil. Slopes normally range from 10 to 15 percent, but in places they range from 2 to 25 percent. Equipment limitation is moderate on the steeper slopes. These soils are fairly productive and yield good crops of pine and hardwoods under proper management. The Hayesville soils are slightly better producers of hardwoods, particulary on northerly slopes, where red oak grows well. In this group littleleaf is in some areas. Soils of the group are suited to shortleaf, loblolly, and Virginia pines and to oaks.

Woodland Suitability Group 12

This group consists of soils in the Chandler and Tallapoosa series. These are well-drained to somewhat excessively drained, micaceous soils that lie on narrow ridges and side slopes at elevations of 1,200 to 3,000 feet. Generally, aspects are southerly. The soils have a fine sandy loam, cobbly fine sandy loam, or loam surface layer over a thin, loam or sandy clay loam subsoil. Slopes range from 6 to 70 percent, but in most places they are 15 to 45 percent. The equipment limitation is severe because of steep slopes, stoniness, and the shallow, micaceous soils. These soils are suited to pines.

Woodland Suitability Group 13

This group is made up of moderately deep, well-drained, micaceous soils of the Fannin series. These soils occupy ridges and side slopes at elevations of 1,200 to 3,000 feet. They have a mainly fine sandy loam surface layer and a micaceous sandy clay loam to clay loam subsoil. Slopes range from 2 to 25 percent, but most commonly they are 10 to 25 percent. The equipment limitation is moderate on the steeper slopes. These soils are well suited to shortleaf pine and lobolly pine at the lower elevations. Red oak also grows well.

Woodland Suitability Group 14

This group consists mainly of well-drained, severely eroded soils of the Fannin, Hayesville, Musella, Rabun, and Wickham series. These soils occur on upland ridges and side slopes. They have a sandy clay loam, gravelly clay loam, or clay loam surface layer over a clay loam to clay subsoil. Slopes range from 6 to 25 percent. Surface runoff on the steeper slopes is rapid because of the moderately fine texture and poor soil structure. Since the rate of infiltration is low, the soils are droughty during periods of low rainfall, and this results in a loss of as much as about 50 percent of the seedlings. The equipment limitation on the steeper slopes is severe in wet periods because of unfavorable texture in the surface layer. This limitation is only moderate on the more gentle slopes. Soils of this group are better suited to pines than to hardwoods. Virginia and shortleaf pines are the preferred species.

USE OF THE SOILS FOR WILDLIFE[3/]

The soils in Dawson, Lumpkin, and White Counties are suited to, and support, one or more kinds of wildlife. Some species frequent woodland; others prefer farmland; and some species require a water habitat. Some animals eat only insects or other animals for food; some require only vegetation; and others prefer a combination of these.

Bobwhites, mourning doves, rabbits, squirrels, foxes, opossums, raccoons, and many nongame birds are common throughout the survey area. Most farms have suitable sites for small fishponds. Deer and turkeys require extensive tracts of woodland where water is abundant, such as the areas in the northern third and west-central parts of the survey area and in the large, wooded areas on and adjacent to flood plains. The long, narrow bottom lands along the larger streams are well suited to migratory ducks, native wood ducks, and beavers. Beaver dams are common along many of these stream bottoms. Following is a summary of the food and habitat needs of the more important kinds of wildlife in Dawson, Lumpkin, and White Counties.

Beaver.--Beaver eat only vegetation, mainly bark, roots, and green plants. Their principal foods from trees are the tender bark, or cambium, of alder, ash, birch, cottonwood, maple, pine, sweetgum, and willow. Beavers also eat honeysuckle, grass, acorns, corn, weeds, and the tender shoots of elder. The chief feeding areas are within 150 feet of water.

Bobwhite.--Choice foods for bobwhite are acorns, beechnuts, blackberries, browntop millet, wild black cherries, corn, cowpeas, dewberries, flowering dogwood, annual and bicolor lespedeza, mulberries, pecans, pine seeds, common ragweed, sweetgum seeds, and beggar weeds. Bobwhite also eat insects. Their food must be close to vegetation that provides shade and protection from predators and adverse weather. Cover range is about 25 acres.

Deer.--Choice foods for deer are acorns, white clover, cowpeas, greenbrier, honeysuckle, flowering dogwood, annual and bicolor lespedeza, oats, tall fescue, ryegrass, and wheat. Mature woodlands of 500 acres or more generally provide adequate cover.

Dove, mourning.--Choice foods for mourning dove are browntop millet, corn, Japanese millet, pine seeds, common ragweed, proso millet, and sweetgum seeds. Doves do not eat insects, green leaves, or fruit. They drink water daily.

Ducks.--Choice foods for ducks are acorns, beechnuts, browntop millet, corn, Japanese millet, and smartweed seed. These foods must be covered with water to be readily available to ducks. Occasionally, ducks eat acorns and corn on dry land.

Rabbit.--These animals require blackberry thickets, plum thickets, or similar cover. Choice foods for rabbits are clovers, winter and summer grasses, and other succulent plants.

Squirrel.--Choice foods for squirrel are acorns, beechnuts, black walnuts, mulberries, pecans, pine seeds, and magnolia seeds.

Turkey.--Generally, turkeys survive only in mature wooded areas that are at least 1,000 acres in size. They need surface water to drink each day, and they often roost in large trees over or near water. Choice foods are insects, acorns, beechnuts, blackberries, dewberries, browntop millet, clover leaves, corn, cowpeas, flowering dogwood, wild grapes, hackberries, mulberries, oats, pecans, pine seeds, tall fescue, ryegrass for forage, and wheat.

Nongame birds.--Different species of nongame birds have different food requirements. Some species eat mostly insects; some are mainly fruit eaters; some eat mostly seeds; and others eat a variety of insects, fruit, and seeds.

Fish.--The principal game fish in Dawson, Lumpkin, and White Counties are brook, rainbow, and brown trout. They are usually found in the mountain streams. The bluegill, sunfish, and large- and small-mouth bass are usually in deeper waters, larger streams, and in lakes. The yellow, speckled, blue, and channel catfish are also in the larger creeks and rivers. The choice foods for bass and trout are aquatic worms, smaller fish, insects, salamanders, frogs, and insect larva. Catfish feed on smaller fish, dead animal matter, worms, and fruits. The supply of food for fish depends on the fertility of the water, on the nature of the soils of the watershed, and, to some extent, on the characteristics of the soils at the bottom of the stream or pond. Because of the acidity and the low fertility of the soils, most ponds need fertilizer and lime to produce enough food to support an adequate supply of catchable fish.

Wildlife Suitability Groups

The soils in Dawson, Lumpkin, and White Counties have been placed in six wildlife suitability groups on the basis of the suitability of soils as habitat for wildlife. The soils in each group are somewhat similar and generally produce about the same kinds of food plants and protective cover. The wildlife suitability groups in these counties are described in the following pages. To find the soils in each group, refer to the "Guide to Mapping Units" at the back of this survey.

The Soil Conservation Service maintains specific, up-to-date technical guides for important kinds of wildlife and fish, and for each significant plant that provides food or cover for wildlife. It also

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3/ SAM CHAPMAN, biologist, Soil Conservation Service, assisted in preparing this subsection.

has specifications for establishing and maintaining soil and water conservation practices that can be adapted to the soils and waters in the survey area. This enables any landowner to obtain practical help in planning and establishing a supply of food and suitable habitat for the kinds of wildlife or fish he wishes to favor.

Wildlife Suitability Group 1

This wildlife group consists of moderately deep to deep, well-drained, very gently sloping to sloping soils on uplands, on stream terraces, and at the base of slopes. These soils occur in small areas throughout the three counties. The surface layer is about 5 to 14 inches thick and is moderately coarse textured to medium textured. Depth to hard rock is more than 5 feet in most places. The slopes range from 2 to 10 percent.

These soils are easy to work, are easily cultivated, and respond well to fertilization. The available water capacity is adequate for all locally grown crops. The erosion hazard is slight to moderate. The root zone is moderately deep to deep.

These soils are suited to many kinds of cultivated crops. They are well suited to most of the plants that provide food and cover for wildlife. These soils are not suited to flooding for duck fields, but some drainageways are suitable for small ponds.

Wildlife Suitability Group 2

This wildlife group consists of deep to moderately deep, well drained to moderate well drained, sloping to moderately steep soils on uplands, on stream terraces, in saddles, and at the base of slopes. Slopes range from 10 to 25 percent. The surface layer is about 5 to 15 inches thick and is medium to moderately coarse textured. The subsoil is friable to firm and is moderately fine textured to fine textured. Depth to hard rock is more than 5 feet in most places.

These soils are easily to fairly easily worked. They respond well to fertilization, but they are not easily worked with modern equipment, because of steep slopes. The available water capacity is chiefly medium but it ranges to high in a few of the soils. The erosion hazard is moderate to severe and varies with the steepness of slope and ground cover.

Most of the acreage is in the southern two-thirds of the survey area, but small areas are scattered throughout the survey area. Most of the acreage has a cover of trees. There are a few cultivated patches and a few areas in pasture. These soils are not suited to annual plants, because of the steep slopes. Their suitability for perennial grasses, lespedeza, and some woody plants is only good to fair, but they are suited to blackgum, wild black cherry, flowering dogwood, hickory, and pine. The many drainageways are suitable sites for small ponds.

Wildlife Suitability Group 3

This wildlife group consists of moderately deep to deep, well-drained, eroded and severely eroded soils that have a deep or moderately deep root zone. These soils are gently sloping to moderately steep, and they occupy uplands, stream terraces, saddles, and the base of slopes. The surface layer and subsoil are generally moderately fine textured or fine textured. Depth to hard rock is more than 5 feet in most places.

These soils are only fairly easy to work. They respond well to fertilization. The available water capacity is adequate for most crops. The clay loam or sandy clay loam surface layer becomes crusty as it dries, and consequently a good stand of plants from seed is difficult to obtain.

Most of the acreage occurs in small areas and is in the southern two-thirds of the survey areas, but small scattered tracts occur in some other parts of the survey area. Most of these soils have been previously cultivated, but many places have been reforested to Virginia and shortleaf pines. The suitability of these soils is only marginal for cultivated crops, clover, small grain, grasses, and many shrubs. Soils of this group are suited to dewberry, lespedeza, and beggar weeds. Some of the drainageways make sites suitable for small ponds.

Wildlife Suitability Group 4

This wildlife group consists of moderately deep to deep, well-drained soils on narrow ridges and on hillsides. Slopes range from 15 to 60 percent. The surface layer is about 3 to 12 inches thick and is medium textured to moderately coarse textured. The subsoil is fine textured to moderately fine textured. Depth to hard rock is more than 5 feet in most places.

These soils are very extensive. Most of the acreage is in the northern half and northwestern part of the survey area. These soils are unsuitable for cultivation because of steep slopes. It is difficult to establish vegetation. Most of the acreage has remained in woods. Oaks are the better suited food plants for wildlife. Sites suitable for ponds are only fair to poor because many areas are too steep for the building of ponds economically.

Wildlife Suitability Group 5

This wildlife group consists of shallow to deep, well-drained to excessively drained soils, many of which are stony, cobbly, or gravelly. All the soils are gently sloping on narrow and broken ridgetops and are steep to very steep on hillsides throughout the north-central part of the survey area. The surface layer is coarse textured or medium textured, and the subsoil is medium textured to moderately fine textured and is very friable to firm or plastic. In many places broken and weathered rock occurs at a depth of about 24 inches.

The available water capacity ranges from low to high, and natural fertility is low to medium. These soils are suited to hickory, oaks, pine, blueberries, dogwood, and wild azaleas. They are generally too shallow to be suitable sites for ponds.

Wildlife Suitability Group 6

This wildlife group consists of deep to moderately deep, excessively drained to poorly drained soils. These soils occur in small to medium-sized areas along drainageways, on flood plains, on low terraces, and around heads of drains. The surface layer is moderately coarse to medium textured. The subsoil is very friable to friable and is coarse textured to moderately fine textured. Depth to hard rock is more than 6 feet in most places.

These soils are easily worked, respond well to fertilization, and are easily cultivated except in the small wet areas. The available water capacity is chiefly medium but ranges from low to high. Flooding is only a slight to moderate hazard for cultivated crops during the growing season.

These soils are productive of most of the plants that produce food and cover for wildlife. They are suited to most of the cultivated crops. Perennial grasses, browntop millet, Japanese millet, smartweed, and white clover can be grown, and so can woody plants for beavers in the poorly drained areas. Many areas of these soils could be flooded for duck ponds, and some narrow bottoms made suitable sites for ponds.

USE OF THE SOILS FOR ENGINEERING[4/]

Some soil properties are of special interest to engineers because they affect the planning, construction, and maintenance of roads, airports, pipelines, foundations, facilities for storing water, structures for controlling erosion, systems for draining and irrigating soils, and leaching fields for the disposal of sewage. Among the soil properties most important to the engineer are permeability, shear strength, compaction characteristics, soil drainage, shrink-swell characteristics, grain size, plasticity, and soil reaction (or pH). Depth to the water table, depth to hard rock, and topography also are important.

This section contains information about the soils of Dawson, Lumpkin, and White Counties that will be helpful to engineers. Most of this information is in tables 4, 5, and 6. Special emphasis has been placed on the engineering properties as related to agriculture. However, due to the increasing importance of other land use in the area, information concerning other related uses of land is included.

The information in this soil survey can be used to--

1. Make soil and land use studies that will aid in selecting and developing sites for industries, businesses, residences, and recreational areas.
2. Make preliminary estimates of the engineering properties of soils for use in planning agricultural drainage systems, ponds, irrigation systems, diversion terraces, and other structures for conserving soil and water.
3. Make preliminary evaluations of soil and ground conditions that will aid in selecting locations for highways, airports, pipelines, and cables and in planning detailed investigations at selected locations.
4. Locate probable sources of sand and other construction materials.
5. Correlate performance of engineering structures with the soil mapping units and thus develop information that will be useful in planning, designing, and maintaining certain engineering practices and structures.
6. Determine the suitability of soils for cross-country movement of vehicles and construction equipment.
7. Supplement the information obtained from other published maps and reports for the purpose of making reports that can be used readily by engineers.
8. Develop other preliminary estimates for construction purposes pertinent to the particular area.

Used with the soil map to identify the soils, the engineering interpretations in this section are useful for many purposes. It should be emphasized, however, that these interpretations do not eliminate the need for soil sampling and testing at the site for a specific structure. Nevertheless, even in such situations, the soil map is useful for planning more detailed field investigations and for suggesting the kinds of problems that can be expected.

Engineers of the State Highway Department of Georgia and the U.S. Soil Conservation Service collaborated with soil scientists of the Soil Conservation Service in preparing this part of the survey. These engineers used their knowledge of soils to interpret laboratory tests and information obtained in the field.

4/ E. L. HELMEY, area engineer, Soil Conservation Service, assisted in the preparation of this section.

Soil name and location	Parent material	SCS 2/ report No.	Depth from surface	Moisture density 3/		Volume change 4/		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	Lb. per cu. ft.	Percent	Percent	Percent	Percent
Hayesville sandy loam:								
350 feet S. of Georgia State Highway 52 on Georgia State Highway 342. (Modal)	Gneiss, schist, and mica gneiss.	9-1	0-4	116	13	8.4	3.0	11.4
		9-4	13-23	99	25	9.4	2.7	12.1
		9-6	31-48	96	25	8.2	3.3	11.5
0.7 mile SE. of Goshen Church. (Finer textured than modal)	Gneiss with intrusions of schist.	5-1	0-4	108	16	3.4	5.7	9.1
		5-4	18-33	93	26	7.5	3.4	10.9
		5-6	45-70	106	18	8.3	4.9	13.2
3 miles N. of Sweetwater Church. (Coarser textured than modal)	Gneiss with intrusions of schist.	1-1	0-5	104	28	6.7	4.9	11.6
		1-4	16-25	97	26	9.7	3.9	13.6
		1-6	30-38	91	15	12.9	3.1	16.0
Musella cobbly loam:								
0.7 mile W. of Westside School and 100 yards W. of Georgia State Highway 53. (Modal)	Gneiss with some acid gneiss.	6-1	0-6	102	21	2.9	3.3	6.2
		6-2	6-18	106	17	6.3	3.4	9.7
		6-3	18-96	83	42	9.8	3.8	13.6
2.0 miles SE. of New Bethel Church. (Finer textured than modal)	Basic rocks.	2-1	0-6	98	28	2.6	13.6	16.2
		2-2	6-16	98	23	9.3	3.2	12.5
		2-3	16-28	81	31	6.5	4.4	10.9
1.6 miles SW. of Lebanon Church. (Coarser textured than modal)	Basic rocks.	7-1	0-6	99	22	8.5	1.0	9.5
		7-4	17-27	87	33	13.7	4.4	18.1
		7-5	27-35	84	34	7.2	6.1	13.3
Tusquitee loam:								
150 yards SE. of Goshen Church. (Modal)	Colluvium.	4-1	0-6	82	31	12.7	2.9	15.6
		4-4	20-36	109	18	6.9	1.3	8.2
		4-6	51-71	112	16	7.7	2.6	10.3
1.6 miles NE. of Amicalola Falls Lake. (Finer textured than modal)	Colluvium.	8-1	0-5	95	22	8.2	3.1	11.3
		8-4	24-65	104	23	7.9	1.6	9.5
		8-5	65-78	107	18	6.9	2.5	9.4
0.6 mile NW. of Georgia Highway 183 on Georgia State Highway 52. (Coarser textured than modal)	Colluvium.	3-1	0-6	100	20	9.9	1.9	11.8
		3-3	14-32	110	17	8.6	1.7	10.3
		3-5	43-60+	105	24	7.3	2.6	9.9

See footnotes at end of table.

TEST DATA [1]

COUNTY

Mechanical analysis [5]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve--							Percentage smaller than--						[6] AASHO	[7] Unified
3-in.	2-in.	3/4-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
---	----	98	95	92	88	45	40	35	24	18	19	NP	A-4(2)	SM
---	---	99	99	97	92	59	56	55	49	43	37	15	A-6(7)	CL
---	---	---	100	99	96	59	58	56	49	44	40	16	A-6(7)	ML-CL
---	---	99	94	89	84	36	30	28	18	12	21	[8] NP	A-4(0)	SM
---	---	---	100	99	96	66	63	62	62	56	51	19	A-7-5(12)	MH
---	---	---	100	99	95	39	38	35	26	22	31	NP	A-4(1)	SM
---	---	99	94	91	87	50	41	33	22	15	25	NP	A-4(3)	SM
---	---	100	96	91	84	62	56	50	42	36	44	17	A-7-6(9)	ML-CL
---	---	99	97	93	83	53	48	47	44	41	49	15	A-7-5(6)	ML
[9] 88	88	84	70	62	50	28	27	23	16	9	26	4	A-2-4(0)	SM-SC
[9] 88	88	88	84	76	67	46	39	37	26	21	28	10	A-4(2)	SC
[9] 88	88	88	88	88	63	44	43	42	36	30	36	12	A-6(2)	SM-SC
[9] 95	94	82	59	48	35	17	17	16	11	7	46	9	A-2-5(0)	SM
[9] 98	98	96	90	84	73	50	45	42	31	24	36	14	A-6(4)	CL
[9] 90	90	76	50	43	37	28	27	27	23	21	52	22	A-2-7(2)	GM-GC
---	100	93	78	71	66	33	32	29	21	13	35	6	A-2-4(0)	SM
100	97	97	96	94	90	64	62	61	49	40	47	18	A-7-6(10)	ML-CL
[9] 95	95	95	93	88	83	61	55	53	41	34	55	20	A-7-5(11)	MH
---	---	100	98	95	90	50	44	34	26	15	48	NP	A-5(4)	SM
---	---	98	92	88	79	50	42	40	28	20	29	7	A-4(3)	SM-SC
---	---	99	93	88	77	48	41	39	28	21	29	10	A-4(3)	SC
---	---	100	95	90	86	43	41	37	24	17	31	7	A-4(2)	SM-SC
---	---	---	99	97	92	55	51	48	38	30	27	6	A-4(4)	ML-CL
---	---	98	98	94	88	50	44	39	28	22	25	NP	A-4(3)	SM
---	---	99	97	93	82	42	40	34	22	11	36	NP	A-4(1)	SM
---	---	---	99	96	86	66	58	56	38	28	29	10	A-4(6)	CL
[9] 92	92	89	82	74	64	42	37	35	28	24	34	12	A-6(2)	SM-SC

TABLE 4.--ENGINEERING

LUMPKIN

Soil name and location	Parent material	SCS 2/ report No.	Depth from surface	Moisture-density 3/		Volume change 4/		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	Lb. per cu. ft.	Percent	Percent	Percent	Percent
Rabun clay loam:								
3 miles N. of Dahlonega on County Road. (Modal)	Basic rocks.	1-2	7-23	81	42	17.2	1.3	18.5
		1-5	48-80	86	31	8.0	8.1	16.1
9.0 miles W. of Dahlonega and 1.0 mile NW. of Silome Baptist Church. (Finer textured than modal)	Basic rocks.	3-1	0-9	93	27	10.5	3.1	13.6
		3-2	9-28	94	28	16.3	2.9	19.2
		3-4	40-55	92	30	14.8	4.4	19.2
0.3 mile S. of Stonepile Gap on U.S. Highway 19. (Coarser textured than modal)	Basic rocks.	2-1	0-3	98	20	7.1	3.3	10.4
		2-4	16-28	98	23	9.6	4.0	13.6
		2-6	36-60	90	31	7.5	11.7	19.2

WHITE

Ashe stony loam:								
9.6 miles from Georgia State Highway 17 on Tray Mountain Road. (Ortho Ashe)	Granite gneiss.	5-3	4-10	105	16	3.4	4.6	8.0
		5-4	10-18	108	13	1.8	2.9	4.7
		5-5	18-30	105	14	3.0	4.6	7.6
9.6 miles from Georgia State Highway 17 on Tray Mountain Road. (Ortho Porters stony)	Granite gneiss.	4-2	1-6	109	12	3.2	.8	4.0
		4-3	6-14	115	14	1.5	0	1.5
		4-4	14-24	109	14	1.4	1.8	3.2
Congaree loam:								
0.25 mile E. of Nacoochee Church and School in Sautee Creek bottom. (Modal)	Alluvium.	2-1	0-10	87	27	4.0	16.0	20.0
		2-2	10-25	84	32	7.7	5.4	13.1
		2-5	36-50	99	20	1.1	13.7	14.8
0.5 mile E. of Georgia State Highway 75 and 200 yards S. of Georgia State Highway 17. (Coarser textured than modal)	Alluvium.	3-1	0-10	89	25	2.0	18.9	20.9
		3-3	15-32	98	18	.6	9.5	10.1

See footnotes at end of table.

TEST DATA 1/--Continued

COUNTY

Mechanical analysis 3/											Liquid limit	Plasticity index	Classification	
Percentage passing sieve--							Percentage smaller than--						AASHO 6/	Unified 7/
3-in.	2-in.	3/4-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
---	---	---	99	98	96	86	84	81	73	63	61	31	A-7-5(20)	MH-CH
---	---	---	---	100	93	70	62	61	47	37	51	14	A-7-5(11)	MH
---	---	99	95	88	80	52	51	51	37	26	40	12	A-6(4)	ML
---	100	99	98	98	94	82	73	72	60	48	52	26	A-7-6(17)	CH
---	---	---	99	98	90	67	61	59	44	37	54	20	A-7-5(13)	MH
---	100	99	94	89	82	45	38	37	34	29	26	6	A-4(2)	SM-SC
---	---	---	100	99	91	60	58	58	54	46	42	18	A-7-6(9)	ML-CL
---	---	---	---	100	96	74	71	70	60	41	47	12	A-7-5(10)	ML

COUNTY

---	---	98	91	86	59	28	27	20	12	8	NP	NP	A-2-4(0)	SM
---	---	---	100	96	70	24	21	15	8	6	NP	NP	A-2-4(0)	SM
---	---	---	---	100	72	20	16	11	7	5	NP	NP	A-2-4(0)	SM
---	---	89	80	77	60	28	27	21	13	9	NP	NP	A-2-4(0)	SM
---	100	90	82	77	56	25	24	18	12	10	NP	NP	A-2-4(0)	SM
---	---	---	99	93	65	21	18	13	9	8	NP	NP	A-2-4(0)	SM
---	---	---	---	100	99	56	55	34	16	13	NP	NP	A-4(4)	ML
---	---	---	---	100	98	57	54	38	18	11	NP	NP	A-4(4)	ML
---	---	---	---	100	98	26	26	18	11	8	NP	NP	A-2-4(0)	SM
---	---	---	---	100	96	49	37	22	10	4	NP	NP	A-4(3)	SM
---	---	---	---	100	99	38	27	17	10	6	NP	NP	A-4(1)	SM

TABLE 4.--ENGINEERING

WHITE

Soil name and location	Parent material	SCS 2/ report No.	Depth from surface	Moisture-density 3/		Volume change 4/		
				Maximum dry density	Optimum moisture	Shrinkage	Swell	Total volume change
			Inches	Lb. per cu. ft.	Percent	Percent	Percent	Percent
Hayesville sandy clay loam:								
0.25 mile NW. of Shoal Creek Church and 100 yards W. of Georgia State Highway 284 on Georgia State Highway 115. (Modal)	Gneiss and some schists.	6-1	0-4	104	16	4.4	6.3	10.7
		6-3	8-21	95	24	4.4	1.1	5.5
		6-5	27-43	99	20	2.6	1.7	4.3
2.0 miles N. of Shoal Creek Church (Finer textured than modal)	Gneiss and granite.	4-1	0-4	100	18	1.9	4.5	6.4
		4-4	19-27	93	25	3.8	.5	4.3
		4-6	32-50	94	24	1.8	2.3	5.1
Porters loam:								
0.6 mile W. of Habersham County line on N. side of Indian Grave Road and 6.1 miles NE. of Helen. (Modal)	Gneiss and granite.	8-1	0-6	88	27	2.9	7.6	10.5
		8-3	9-15	104	19	5.4	5.3	10.7
		8-4	15-38	103	19	.3	5.5	5.4
100 yards N. of Helen on E. side of Georgia State Highway 75. (Finer textured than modal)	Gneiss, granite, and schist.	7-1	0-6	103	18	7.0	2.2	9.2
		7-4	13-21	106	18	3.6	3.1	6.7
		7-5	21-37	112	15	1.6	5.0	6.6
0.3 mile SW. of Unicoi Gap. (Coarser textured than modal)	Gneiss, granite, and schist.	9-1	0-4	94	22	2.1	11.4	13.5
		9-3	8-22	102	18	.7	8.9	9.6
		9-4	22-34	101	20	1.3	11.2	12.5
Wickham fine sandy loam:								
4.5 miles NE. of Helen and 4 miles SE. of Indian Grave Gap.	Granite gneiss.	3-1	0-4	100	19	.4	0	.4
		3-3	8-34	100	22	8.4	2.2	10.6
		3-4	34-55	102	20	8.2	2.8	11.0

1/ Tests performed by the State Highway Department of Georgia, in cooperation with the U.S. Department of Commerce, Bureau of Public Roads (BPR). The tests were performed in accordance with standard procedures of the American Association of State Highway Officials (AASHO) (1).

2/ In Dawson County the SCS Report Number is S-62-Ga-42; in Lumpkin County S-62-Ga-93; and in White County S-63-Ga-154.

3/ Based on AASHO Designation T 99-57, Methods A and C (1).

4/ Based on "A System of Soil Classification" by W. F. Abercrombie. Published in 1954 in Proceedings of the 33rd Annual Meeting Highway Res. Bd. Pub. 324: 509-514, illus. Washington, D.C.

5/ According to the AASHO Designation T 88 (1). Results by this procedure frequently may differ somewhat from the results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that which is coarser than 2

TEST DATA [1]--Continued

COUNTY

Mechanical analysis [3]											Liquid limit	Plasticity index	Classification	
Percentage passing sieve--							Percentage smaller than--						AASHO [6]	Unified [7]
3-in.	2-in.	3/4-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.02 mm.	0.005 mm.	0.002 mm.				
---	100	99	97	94	79	43	43	36	28	24	25	9	A-4(2)	SC
---	---	---	---	100	87	65	61	56	50	48	50	20	A-7-5(12)	ML-CL
---	---	---	---	100	74	51	50	44	37	35	47	18	A-7-6(7)	ML-CL
---	---	100	98	96	81	45	41	34	24	19	27	9	A-4(2)	SC
---	---	---	100	97	83	67	67	64	54	50	52	19	A-7-5(12)	MH
---	---	---	100	98	84	52	51	43	36	32	48	19	A-7-6(7)	ML-CL
---	---	99	90	85	65	35	33	26	16	10	NP	NP	A-2-4(0)	SM
---	---	98	90	88	67	37	36	28	19	13	33	NP	A-4(0)	SM
9/85	85	82	78	74	60	24	23	16	10	8	NP	NP	A-2-4(0)	SM
100	99	96	89	86	79	43	41	25	14	9	NP	NP	A-4(2)	SM
---	---	100	96	91	84	48	46	34	27	24	30	6	A-4(3)	SM-SC
9/88	88	85	69	63	51	25	23	18	14	13	NP	NP	A-2-4(0)	SM
---	---	100	93	85	70	34	32	23	13	8	NP	NP	A-2-4(0)	SM
---	---	---	98	96	80	41	40	32	22	18	NP	NP	A-4(1)	SM
9/90	90	90	90	88	73	35	32	24	15	12	NP	NP	A-2-4(0)	SM
---	---	92	83	79	68	36	32	26	18	14	35	NP	A-4(0)	SM
---	---	---	100	96	89	57	53	48	40	35	42	NP	A-5(5)	ML
---	---	99	99	97	87	58	56	48	37	31	36	NP	A-4(5)	ML

millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.

[6] Based on AASHO Designation M 145-49 (1).

[7] Based on the Unified Soil Classification System (13). SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points from A-line are to be given a borderline classification, for example, ML-CL or SM-SC.

[8] NP = Nonplastic.

[9] The difference between this percentage and 100 is accounted for by fragments larger than 3 inches that were discarded in field sampling. Laboratory test data corrected for amount discarded.

At many construction sites the soils vary greatly within the depth of the proposed excavation and within short distances. The maps, soil descriptions, and other data in this survey may be used in planning detailed soil investigations necessary at the construction site. This may help reduce the number of soil samples that are needed for laboratory testing. After the soils have been tested and their behavior in place has been observed under varying conditions, the engineer should be able to correlate these with the properties of similar soil units at other sites throughout the area.

Information of value in planning engineering work is given throughout the text, particularly in the sections "Descriptions of the Soils" and "Formation and Classification of the Soils." Some terms used by soil scientists may be unfamiliar to engineers, and many words have special meaning in soil science. Such terms are defined in the Glossary at the back of this survey.

Engineering Classification Systems

Most highway engineers classify soil materials according to the system approved by the American Association of State Highway Officials (AASHO) (1). In this system soil materials are classified in seven principal groups. The groups range from A-1, consisting of gravelly soils of high bearing capacity, to A-7, consisting of clayey soils that have low strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. Group indexes range from zero for the best materials to 20 for the poorest. In this soil survey, group index numbers are assigned only to soils on which tests have been performed (table 4). The five fractions of material recognized are boulders, gravel, coarse sand, fine sand, and combined silt and clay. Whether a soil is "silty" or "clayey" depends on the plasticity index. Silty is applied to material having a plasticity index of 10 or less and clayey is applied to fine materials having a plasticity index of more than 10.

Some engineers prefer to use the Unified soil classification system (13). In this system soil materials are identified as coarse grained when more than half of the material (by weight) is retained on the 200-mesh sieve (sand, gravel, and cobblestones). The fine-grained material has more than half of the material (by weight) passing through the 200-mesh sieve (silt and clay). There are 8 classes of coarse-grained material, 6 classes of fine-grained material, and the highly organic soils.

The engineering classification of soil samples tested in accordance with the AASHO system and the Unified system are shown in table 4.

Test Data and Engineering Properties of the Soils

Soil samples from 24 profiles representing eight series were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The data obtained from these tests are given in table 4. The samples were taken from different locations, and the test data show some variation in characteristics of the soils. The data, however, probably do not show the maximum variations in the B and C horizons. All samples were obtained at a depth of 96 inches or less. The test data therefore may not be adequate for estimating soil properties in deep cuts in areas where the soils are rolling, hilly, or steep. These samples were tested for moisture-density relationships, volume change, grain-size distribution, liquid limit, and plasticity index.

In the moisture-density (compaction) test, soil material is molded with a specified compactive effort. The test is repeated several times, with a successively higher moisture content each time, while the compactive effort remains constant. The dry density (unit weight) of the soil increases as the moisture content increases until the optimum moisture content is reached. Beyond this, the dry density decreases as the moisture content increases. The highest dry density obtained in the test is called the maximum dry density, and the corresponding moisture content is called the optimum moisture. Moisture-density data are important in earthwork because optimum stability is usually obtained if the soil is compacted to about the maximum dry density at approximately optimum moisture.

Volume change, expressed as a percentage of the dry volume, is the difference in the volume of a soil when it dries from a stipulated or known moisture content to the shrinkage limit, or expands from the shrinkage limit to a known moisture content because of the absorption of water.

Mechanical analysis is used to determine the proportions of the different size particles. The clay content is obtained by the hydrometer method, so these results should not be used in naming soil textural classes.

The values shown for liquid limit and plasticity index indicate the effect of water on the consistency of the soil material. As the content of moisture in a clayey soil increases from a dry state, the material changes from a semisolid state to a plastic state. As the moisture content is further increased, the material changes from a plastic state to a liquid state. The plastic limit is the moisture content at which the material passes from a semisolid state to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic state to a liquid state. The plasticity index is a numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which the soil material is plastic.

Table 5 gives estimates of the properties of the soils that are significant to engineering. The estimates are based on field observations, on experience, and to some extent, on laboratory tests. These estimates apply only to the soils of the survey area.

As shown in table 5, all of the soils identified as one series have essentially the same profile and are fairly uniform in engineering properties in their respective horizons. For example, the profile of Hayesville sandy loam is like that of Hayesville sandy clay loam except for the uppermost 9 inches. Accordingly, the engineering properties of eroded or severely eroded soils, as compared with those of uneroded soils in the same series, depend on the amount of soil that has been removed from the original surface layer.

The information in the column showing depth from surface is based on the descriptions of typical profiles given in the section "Descriptions of the Soils."

Table 5 gives the textural classification of the U.S. Department of Agriculture and estimates of the Unified classification and of the classification used by the American Association of State Highway Officials. The information concerning grain-size distribution, permeability, available water capacity, reaction, and shrink-swell potential has been generalized from laboratory tests of some of the soils and has been estimated for the others.

The estimates of permeability are based on soil structure and porosity and have been compared with the results of permeability tests on undisturbed cores of similar soil material. The rate is expressed as inches per hour.

Available water capacity is the capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field capacity and the amount at wilting point. It is expressed as inches of water per inch of soil.

The pH values in the column headed "Reaction" indicate the degree of soil acidity (less than 7.0) or alkalinity (more than 7.0).

The ratings for shrink-swell potential indicate the volume change resulting from the shrinking of the soil when it dries and the swelling of the soil as it becomes saturated. In general, soils classified as CH and A-7 have high shrink-swell potential. Soils having small amounts of nonplastic to slightly plastic material have low shrink-swell potential.

Table 6 shows features of the soils that affect the selection, design, or application of land-treatment measures, and it notes the suitability of the soils for specific purposes. The information in this table is based on the estimated data in table 4, on actual test data available, and on field experience.

The ratings as a source of topsoil are based on suitability of a soil for dressing slopes and road shoulders and for lining ditches to promote growth of vegetation. Severely eroded areas are not suitable sources of topsoil material. None of the soils as they occur naturally in the survey area are suitable as a source of coarse or fine aggregate for concrete.

The ratings as a source of material for road fill are based primarily on suitability for use in construction of stable fill. Consideration was given to the presence of rocks and boulders, to the depth to hard rock, and to the presence of excess moisture.

Road-base material consists primarily of well-graded, gravelly soils and soil material free of organic matter. The soils are rated good, fair, or poor. A well-drained, gravelly soil is given a rating of good. A clayey soil that contains some gravel and is not too well drained is given a rating of fair. A soil not suitable for road base is given a poor rating.

Several soil features adversely influence highway location and construction. They include a high water table, flooding, seepage, highly plastic soil material, shallowness to bedrock, boulders, unstable slopes, and erodibility.

Properties of the soils that make them unfavorable for use as reservoir sites and as sources of embankment material for construction of farm ponds should be carefully evaluated. Unnatural water loss can be expected from sites on soils that have rapid permeability and excessive seepage. Embankments generally can be constructed with soil material that has moderate strength and stability.

Agricultural drainage is needed on some soils on first bottoms and on low stream terraces. Soils that have moderate permeability can be drained satisfactorily if adequate outlets for drainage systems are available.

Soil features that affect suitability for irrigation are drainage, permeability, infiltration, and available water capacity. A portable sprinkler irrigation system is the most suitable method in this survey area.

Terraces and waterways are used for erosion control. Stones, shallowness, and irregular and steep slopes are detrimental soil features. On slopes of 10 percent or more, terraces are difficult to construct and maintain. In addition, erodibility of the soil and difficulty in establishing vegetation interfere with the establishment of waterways. A seasonal high water table limits the use of equipment in shaping and seeding waterways.

There are no reliable sources of sand or natural gravel in the survey area. Small areas of poorly graded sand occur on the flood plains of several streams in the three counties. The largest areas are along Tesnatee and Dukes Creeks in White County. Small areas occur along the Chattahoochee River in White County, along the Etowah River in Dawson and Lumpkin Counties, and along the Chestatee River in Lumpkin County.

TABLE 5.--SOILS AND THEIR ESTIMATED

[Properties of Gullied land and Rock land were

Soil series and map symbol	Depth from surface	Classification			Percentage passing sieve--
		Dominant USDA texture	Unified	AASHO	No. 4 (4.7 mm.)
	Inches				
Appling: AmC2------	0-7	Sandy loam-----	SM	A-2	95-100
	7-52	Clay loam------	MH, MH-CH, CL, ML	A-7, A-6	95-100
	52-74	Sandy loam-----	SM	A-4	95-100
Ashe: AcG, AEE, AEF. (For properties of Edneyville soils in mapping units AEE and AEF, see the Edneyville series.)	0-6	Fine sandy loam.	SM	A-2	80-95
	6-15	Loam----------	SM	A-2	80-100
	15-38	Fine sandy loam.	SM	A-2	70-100
	38	Partially weathered rock.			
Augusta: AwB, AwC--	0-6	Fine sandy loam.	SM, ML	A-2, A-4	95-100
	6-33	Clay loam to sandy clay loam.	ML, CL	A-4, A-6	95-100
	33-50	Fine sandy loam.	SM, SC	A-4, A-6	90-95
Buncombe: Bfs------	0-70	Loamy sand-----	SM	A-2	100
Burton: BvF--------	0-19	Loam----------	SM	A-4, A-2	80-95
	19-32	Loam----------	ML, SM	A-4, A-6, A-2	85-95
	32-38	Sandy loam-----	SM	A-2	75-100
	38	Partially weathered gneiss.			
Cartecay: Cac------	0-5	Fine sandy loam.	SM, SC	A-4, A-2	100
	5-23	Fine sandy loam to loam.	SM	A-4, A-2	100
	23-52	Loamy sand to sandy loam.	SM	A-2	100
Chandler: CCF------	0-16	Loam----------	ML, SM	A-4	80-100
	16-72	Loam----------	ML, SM	A-4	75-90
Congaree: Con------ (For properties of Starr soils in mapping unit Con, see the Starr series.)	0-50	Fine sandy loam, loam, or silt loam.	SM, ML	A-4, A-2	95-100

See footnotes at end of table.

not estimated, because they are too variable]

Percentage passing sieve--Continued		Permeability	Available water capacity 1/	Reaction	Shrink-swell potential
No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
		Inches per hour	Inches per inch of soil	pH	
90-100	20-35	2.0-6.3	0.12	5.1-5.5	Low.
95-100	55-75	0.63-2.0	.13	5.1-5.5	Moderate.
90-95	36-45	0.63-2.0	.12	5.1-5.5	Low.
75-85	20-30	2.0-6.3	.13	5.1-5.5	Low.
75-95	25-35	2.0-6.3	.12	5.1-5.5	Low.
65-100	20-30	2.0-6.3	.08	4.5-5.0	Low.
95-100	30-55	2.0-6.3	.12	5.1-5.5	Low.
95-100	50-60	0.63-2.0	.13	5.1-5.5	Moderate.
90-95	36-50	0.63-2.0	.13	5.1-5.5	Low.
95-100	15-25	>6.3	.07	5.1-6.0	Low.
75-85	25-40	>6.3	.17	5.1-5.5	Low.
75-85	30-55	0.63-2.0	.15	5.1-6.0	Low.
70-95	25-35	2.0-6.3	.14	5.1-5.5	Low.
95-100	25-50	2.0-6.3	.11	5.6-6.0	Low.
95-100	25-40	2.0-6.3	.10	5.6-6.0	Low.
95-100	15-25	>6.3	.09	5.6-6.0	Low.
75-85	36-55	2.0-6.3	.12	5.1-5.5	Low.
60-75	36-55	2.0-6.3	.08	5.1-5.5	Low.
95-100	30-70	0.63-2.0	.13	5.1-6.0	Low.

Soil series and map symbol	Depth from surface	Classification			Percentage passing sieve--
		Dominant USDA texture	Unified	AASHO	No. 4 (4.7 mm.)
	Inches				
Edneyville: EPD, EPE, EPF, EPG.	0-21	Fine sandy loam or loam.	SM	A-4	85-95
	21-25	Clay loam-------	ML, CL, SM, SC	A-4, A-6	85-100
	25-48	Fine sandy loam-	SM	A-4, A-2	65-90
	48	Rock.			
Fannin: FaB, FaC, FaE, FbC2, FbE2, FcF.	0-10	Fine sandy loam-	SM	A-2, A-4	90-100
	10-38	Sandy clay loam to silty clay loam.	ML, CL, MH	A-6, A-7	95-100
	38-58	Fine sandy loam-	ML, SM	A-6	90-100
Hayesville: HIB, HIC, HIE, HJC3 2/, HJE3 2/, HKC3 2/, HLC, HLD, HLF. (For properties of the Rabun soils in mapping units HKC3, HLC, HLD, and HLF, see the Rabun series.)	0-9	Sandy loam------	SM, SC	A-4	85-100
	9-31	Sandy clay loam to clay.	MH, CL, ML-CL	A-6, A-7	95-100
	31-48	Fine sandy loam and fine sandy clay loam.	ML, ML-CL, SM	A-4, A-6, A-7	95-100
Hiwassee: HSD, HSF, HSC.	0-7	Loam----------	SM	A-4, A-2	95-100
	7-14	Sandy clay loam-	ML, SM	A-6, A-4	100
	14-55	Clay to clay loam.	CL, MH	A-7, A-6	65-90
	55-72	Sandy clay loam or clay loam.	SM, CL	A-4, A-6	90-100
Masada: MoB, MoB2, MoC2, MoD2.	0-6	Fine sandy loam-	SM	A-4, A-2	95-100
	6-43	Fine sandy clay loam.	CL, ML, SM	A-6, A-7	100
	43-60	Fine sandy loam-	SM, ML	A-6, A-4	100
Musella: MCE, MCG, MuE2.	0-4	Gravelly clay loam.	SM, SM-SC	A-2, A-4	55-85
	4-48	Gravelly clay loam.	CL, ML-CL, ML, MH, SM-SC, GM-GC.	A-6, A-7, A-4	70-95
	48	Partially weathered rock.			

See footnote at end of table.

Percentage passing sieve--Continued		Permeability	Available water capacity 1/	Reaction	Shrink-swell potential
No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	Inches per hour	Inches per inch of soil	pH	
75-85	36-40	2.0-6.3	0.10	5.1-5.5	Low.
80-90	36-55	0.2-6.3	.17	5.1-5.5	Low.
65-85	30-50	2.0-6.3	.09	5.1-5.5	Low.
35-100	30-45	2.0-6.3	.11	5.1-5.5	Low.
90-100	55-75	0.63-2.0	.14	5.1-5.5	Moderate.
80-90	36-65	0.63-2.0	.12	5.1-5.5	Low.
85-95	36-50	2.0-6.3	.14	5.1-5.5	Low.
90-100	55-70	0.63-2.0	.17	5.1-5.5	Moderate.
85-100	36-60	0.63-2.0	.12	5.1-5.5	Low.
95-100	30-45	2.0-6.3	.14	5.1-5.5	Low.
95-100	36-55	0.63-2.0	.15	5.1-5.5	Moderate.
85-90	55-70	0.63-2.0	.13	5.1-5.5	Moderate.
80-90	36-60	0.63-2.0	.13	5.1-5.5	Low.
95-100	25-40	2.0-6.3	.13	5.1-5.5	Low.
100	40-60	0.63-2.0	.15	5.1-5.5	Moderate.
100	36-55	0.63-2.0	.12	5.1-5.5	Moderate.
45-75	17-40	2.0-6.3	.09	5.1-5.5	Low.
70-95	40-65	0.63-2.0	.10	5.1-5.5	Moderate.

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Soil series and map symbol	Depth from surface	Classification			Percentage passing sieve--
		Dominant USDA texture	Unified	AASHO	No. 4 (4.7 mm.)
	Inches				
Porters---------- (Mapped only in undifferentiated units with Edneyville soils.)	0-6	Loam----------	SM	A-4, A-2	85-95
	6-22	Clay loam-------	SM, SM-SC	A-4, A-6	80-100
	22-48	Fine sandy loam and loam.	SM	A-4, A-2	65-90
	48	Saprolite; 50 percent rock fragments.			
Rabun: RaE, RbD3, RbE3.	0-6	Clay loam-------	ML, SM-SC, CL	A-4, A-6, A-7	90-100
	6-31	Clay----------	MH, MH-CH	A-7	95-100
	31-38	Clay loam-------	MH, CL, ML, SM	A-6, A-7, A-4	95-100
	38-60	Loam, clay loam-	ML, SM, MH	A-4, A-6, A-7	95-100
Starr: Sta----------	0-12	Fine sandy loam or loam.	SM, SM-SC	A-4, A-2	95-100
	12-18	Sandy clay loam-	CL, SM	A-6, A-4	95-100
	18-47	Clay loam or sandy clay loam.	CL, ML	A-6	95-100
	47-60	Fine sandy loam-	SM	A-4	90-100
Tallapoosa: TbE, TcE, TdG.	0-5	Fine sandy loam-	SM	A-2	90-100
	5-18	Sandy clay loam-	ML, CL, SM	A-4, A-6	80-95
	18-72	Fine sandy loam-	SM	A-4	70-85
Toccoa: Toc----------	0-38	Fine sandy loam-	SM	A-2, A-4	95-100
	38-50	Loamy sand------	SM	A-2	100
Tusquitee: TlC, TlD, TlF, TmE, TmF.	0-8	Loam----------	SM, SM-SC	A-4, A-5	80-100
	8-74	Clay loam-------	ML, CL, SM-SC, SM, SC	A-4, A-6	80-100
Wehadkee: Wed-------	0-6	Silt loam-------	SM, ML	A-4	95-100
	6-42	Sandy clay loam-	ML, CL	A-4, A-6	100
	42-60	Sandy loam------	SM	A-4	95-100
Wickham: WgC, WgD, WgF, WnD3.	0-8	Fine sandy loam-	SM	A-2, A-4	80-100
	8-72	Sandy clay loam-	ML	A-6, A-5	95-100

1/ Center of range is shown here; value may vary about 0.02, plus and minus, from value shown.

SIGNIFICANT IN ENGINEERING--Continued

Percentage passing sieve--Continued		Permeability	Available water capacity 1/	Reaction	Shrink-swell potential
No. 10 (2.0 mm.)	No. 200 (0.074 mm.)	Inches per hour	Inches per inch of soil	pH	
85-95	30-45	2.0-6.3	0.16	5.1-5.5	Low.
80-100	36-50	2.0-6.3	.14	5.1-6.5	Low.
60-90	20-40	2.0-6.3	.06	5.1-5.5	Low.
85-100	45-75	2.0-6.3	.14	5.1-6.0	Low.
95-100	60-90	0.63-2.0	.15	5.1-6.0	Moderate.
90-100	45-90	0.63-2.0	.15	5.1-6.0	Low to moderate.
90-100	36-75	2.0-6.0	.14	5.1-6.0	Low to moderate.
90-95	30-40	2.0-6.3	.14	5.1-5.5	Low.
90-95	36-55	2.0-6.3	.16	5.1-5.5	Low.
75-90	50-65	2.0-6.3	.18	5.1-5.5	Moderate.
75-90	36-45	2.0-6.3	.12	5.1-5.5	Low.
75-90	20-35	2.0-6.3	.12	4.5-5.5	Low.
70-80	40-60	0.63-2.0	.13	4.5-5.5	Low to moderate.
60-85	36-50	2.0-6.3	.05	4.5-5.5	Low.
95-100	25-50	2.0-6.3	.11	5.6-6.0	Low.
95-100	15-25	>6.3	.07	5.6-6.0	Low.
80-95	40-50	2.0-6.0	.14	5.1-5.5	Low.
70-100	40-70	2.0-6.0	.15	5.1-5.5	Moderate.
95-100	40-60	2.0-6.3	.20	4.5-5.5	Low.
100	60-70	0.63-2.0	.14	4.5-5.5	Low to moderate.
95-100	36-45	0.63-2.0	.12	4.5.5.5	Low.
75-95	30-45	2.0-6.3	.13	5.1-5.5	Low.
95-100	55-65	0.63-2.0	.14	5.1-5.5	Moderate.

2/ These soils have a finer textured surface layer than described. Therefore, the Unified and AASHO classifications vary by one or two classes.

TABLE 6.--ENGINEERING

[Gullied land and Rock land are not

Soil series and map symbols	Suitability as source of--		Soil features adversely affecting--
	Topsoil	Road fill	Highway location
Appling: AmC2	Good in surface layer; otherwise fair.	Fair: moderate traffic-supporting capacity.	Slopes erode readily in deep cuts and in unprotected embankments.
Ashe: AcG, AEE, AEF. For interpretations of Edneyville soils in mapping units AEE and AEF see the Edneyville series.	Fair to poor because of cobblestones.	Fair: cobblestones and stones.	Moderate stability and strength; 2 to 5 feet to bedrock.
Augusta: AwB, AwC	Fair in surface layer	Fair: moderate traffic-supporting capacity.	Seasonal high water table at a depth of less than 1 foot.
Buncombe: Bfs	Poor: low fertility	Good	Moderate strength and stability; subject to occasional flooding.
Burton: BvF	Good: slopes may limit accessibility of source.	Poor: surface layer fairly high in organic-matter content.	Moderate strength and stability; surface layer is fairly high in organic-matter content.
Cartecay complex: Cac	Fair to good	Fair to good	Seasonal high water table; subject to flooding; moderate stability.
Chandler: CCF	Fair: about 16 inches of source material.	Fair to good: slopes may limit the accessibility of material.	Moderate strength and stability; slopes.
Congaree and Starr: Con	Good	Fair to good: flooding; moderate stability.	Subject to flooding

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suitable for the engineering practices listed]

Soil features adversely affecting--Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Soil properties generally favorable.	Soil properties generally favorable.	Not needed; well drained.	Moderate permeability; rapid to slow intake rate.	Moderately erodible.	Moderately erodible.
Moderately rapid permeability and seepage; 2 to 5 feet to bedrock; slopes.	Moderate stability; variable material; rocks present.	Not needed; excessively drained.	Low available water capacity; slopes.	Stones and rock near the surface; slopes.	Stones and rock near the surface; slopes.
Soil properties generally favorable.	Moderate shrink-swell potential; moderate strength and stability.	Moderate permeability; seasonal high water table.	Medium intake rate; moderate available water capacity.	Where terraces and diversions are needed, soil properties generally favorable.	Seasonal high water table.
Rapid permeability.	Moderate strength and stability; seepage likely.	Not needed; excessively drained.	Low available water capacity; rapid intake rate.	Not needed; rapid permeability.	Low available water capacity.
Moderate permeability; slopes.	Moderate stability; cobblestones in lower part of profile.	Not needed; well drained to moderately well drained.	Slopes----------	Cobblestones at a depth of about 32 inches.	Cobblestones at a depth of about 32 inches.
Moderately rapid permeability.	Moderate stability--	Seasonal high water table.	Soil properties generally favorable.	Not needed; nearly level.	Not needed; nearly level.
Moderately rapid permeability and seepage; slopes.	Moderate stability; coarse fragments below a depth of about 16 inches.	Not needed; somewhat excessively drained.	Low available water capacity; slopes.	Moderately erodible; slopes.	Moderately erodible; slopes.
Moderate to moderately rapid permeability; moderate to slow seepage likely.	Moderate stability--	Drainage generally not needed; well drained.	Soil properties generally favorable.	Not needed; nearly level.	Not needed; nearly level.

Soil series and map symbols	Suitability as source of--		Soil features adversely affecting--
	Topsoil	Road fill	Highway location
Edneyville and Porters: EPD, EPE, EPF.	Good in surface layer if soil is not cobbly or stony; fair in subsoil.	Good to fair: rating determined by percentage of stones and cobblestones.	Slopes; cobblestones, stones, and rock outcrops.
Fannin: FaB, FaC, FaE, FbC2, FbE2, FcF.	Fair if soil is not eroded--	Fair: fairly high mica content.	Moderately high strength and stability; slopes.
Hayesville: HIB, HIC, HIE, HJC3, HJE3.	Fair if soil is not severely eroded.	Fair: moderate traffic-supporting capacity.	Soil properties generally favorable where slopes are less than about 15 percent.
Hayesville and Rabun: HLC, HLD, HLF, HKC3.	Fair if soil is not severely eroded.	Fair: moderate shrink-swell potential.	Moderate shrink-swell potential; slopes.
Hiwassee: HSC, HSD, HSF---	Poor: thickness of suitable source material.	Poor: moderate shrink-swell potential; high clay content.	Moderate shrink-swell potential; in some areas slopes are greater than about 15 percent.
Masada: MoB, MoB2, MoC2, MoD2.	Good in surface layer; fair below.	Good----------	Moderate strength and stability.
Musella: MCE, MCG, MuE2---	Poor: many rock fragments at depth of about 19 inches; cobbly surface layer in some areas.	Poor: shallow to rock; rock outcrops.	Shallow to rock; common rock outcrops.

Soil features adversely affecting--Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Moderate to moderately rapid permeability.	Rock, cobblestones, stones, and boulders near the surface.	Not needed; well drained.	Moderate rapid intake rate; slopes.	Moderately erodible; shallow to rock; slopes.	Moderately erodible; in some areas slopes are greater than 15 percent.
Moderate permeability; slow seepage likely.	High content of mica below a depth of about 38 inches.	Not needed; well drained.	Moderate to rapid intake rate; slopes.	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible; in some areas slopes are greater than 15 percent.
Moderate permeability; slow seepage likely.	Soil properties generally favorable.	Not needed; well drained.	Moderate intake rate if the soil is not severely eroded; slopes.	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible; in some areas slopes are greater than 15 percent.
Moderate seepage and permeability.	Moderate shrink-swell potential; moderately pervious when compacted.	Not needed; well drained.	Slow to moderate intake rate, depending on degree of erosion; medium available water capacity.	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible; in some areas slopes are greater than 15 percent.
Moderate permeability.	Moderate stability; moderate shrink-swell potential.	Not needed; well drained.	Slow intake rate; medium available water capacity; slopes.	Soil properties are favorable where slopes are less than 10 percent.	Soil properties favorable where slopes are less than about 15 percent.
Moderate permeability; slow seepage likely.	Moderate strength and stability.	Not needed; well drained.	In some areas slopes are greater than about 6 percent; medium intake rate.	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible.
Moderate seepage likely; moderate permeability.	Moderately pervious when compacted; rock fragments.	Not needed; well drained.	Slow intake rate; low productivity; slopes.	Moderately erodible; shallow to rock; slopes.	Moderately erodible; shallow to rock; rock outcrops.

Soil series and map symbols	Suitability as source of--		Soil features adversely affecting--
	Topsoil	Road fill	Highway location
Rabun: RaE, RbD3, RbE3	Fair: about 6 inches of suitable material.	Poor to fair: moderate shrink-swell potential; clayey material.	Moderate shrink-swell potential; slopes.
Starr: Sta	Good	Fair to good	Hazard of brief flooding.
Tallapoosa: TbE, TcE, TdG.	Fair for TcE; poor for TbE and TdG because of cobblestones.	Fair to poor; rock fragments below a depth of about 18 inches.	Cobblestones and rock near the surface.
Toccoa: Toc	Good	Good	Seasonal high water table; subject to flooding.
Tusquitee: TlC, TlD, TlF, TmE, TmF.	Good	Good to fair	Moderate stability; slopes.
Wehadkee: Wed	Poor: subject to flooding; seasonal high water table.	Poor: moderate shrink-swell potential; flooding; seasonal high water table.	Seasonal high water table; moderate shrink-swell potential; subject to flooding.
Wickham: WgC, WgD, WgF, WnD3.	Good if the soil is not severely eroded.	Fair to good	Soil properties generally favorable.

Soil features adversely affecting--Continued					
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions	Waterways
Reservoir area	Embankment				
Moderate seepage and moderate permeability.	Moderate shrink-swell potential; moderately pervious when compacted.	Not needed; well drained.	Slow to moderate intake rate, depending on degree of erosion; slopes.	Moderately erodible; slopes	Moderately erodible; slopes.
Moderately rapid permeability and seepage.	Soil properties generally favorable.	Not needed; well drained.	Soil properties are generally favorable.	Not needed; mainly nearly level.	Not needed; mainly nearly level.
Moderate permeability.	Cobblestones and rock near the surface.	Not needed; well drained.	Slopes----------	Cobblestones and rock near the surface.	Cobblestones and rock near the surface.
Moderately rapid permeability; many areas underlain by gravel.	Poorly graded material in some areas; seepage likely.	Seasonal high water table; subject to flooding.	Soil properties are favorable.	Not needed; nearly level.	Not needed; nearly level.
Moderate seepage; moderately rapid permeability.	Coarse fragments in lower part of profile; moderate strength and stability.	Not needed; well drained.	Slopes----------	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible; in some areas slopes are greater than 15 percent.
Moderate permeability.	Moderate shrink-swell potential.	Seasonal high water table; outlets seldom available.	Risk of flooding; seasonal high water table.	Not needed; nearly level.	Not needed; nearly level.
Moderate permeability; slow seepage likely.	Soil properties generally favorable.	Not needed; well drained.	Slopes----------	Moderately erodible; in some areas slopes are greater than 10 percent.	Moderately erodible; in some areas slopes are greater than 15 percent.

This section rates the soils of the three counties according to the soil limitations that affect nine uses in town and country planning. These uses are foundations for dwellings, septic tank filter fields, oxidation ponds, campsites, picnic areas, intensive play areas, gardens, structures for light industry, and trafficways.

In selecting a site for a dwelling, a recreational facility, a sewage disposal system, or other use, the suitability of the soils at each site must be determined. Some of the more common soil properties affecting use are soil texture, internal drainage, permeability, susceptibility to flooding, steepness of slopes, depth to hard rock, and depth to water table. It is understandable that although some of these properties are important for a given use, others are insignificant to that use. On the basis of these and related characteristics, soil scientists have reviewed the requirements and have rated the soils as listed in table 7.

The ratings used are slight, moderate, and severe, and they apply to the soils as they occur naturally. If the rating is slight, little or no adjustment is needed in use, and the limitations are not listed. A moderate rating means that some adjustment is needed in use. A rating of severe indicates that extensive adjustments are needed before the soil is suitable for the specified purpose. The soil properties that result in a limitation rating of moderate or severe are listed in the table adjacent to the rating.

Extensive manipulation of a soil will alter some of its natural properties. Therefore, in areas where there has been extensive cutting and filling of material, the ratings in table 7 no longer apply for some uses.

The ratings in table 7 represent the typical condition of the soil. The limitations at a particular site may vary in degree and kind from those listed in the table because of the allowable variation within any one soil unit. Supplementary, onsite investigations should be made before using the soils for the purposes listed in table 7.

The following paragraphs define each use shown in the table, and the important properties that affect suitability are discussed.

Foundations for dwellings.--In this soil survey, dwellings refer to houses of three stories or less, and may be built as single units or in large subdivisions. The significant soil properties are shrink-swell potential, depth to water table, flood hazard, slope, and depth to hard rock. The suitability for a sewage system is not considered in this rating. Ratings for septic tank filter fields and sewage lagoons are rated as separate items.

Septic tank filter fields.--These are systems that use the soil as a filter field to dispose of household waste. The maximum capacity will adequately accommodate a three-story residential building. Lot size is not considered in this criteria, but should be considered for systems that are heavily used. Important soil properties affecting the suitability of this type of disposal system are the percolation rate, shrink-swell behavior, depth to water table, flood hazard, slope, and the depth to hard rock.

Oxidation ponds.--The oxidation ponds considered in table 7 consist of a fluid impoundment area and a dam or dike. The household waste is impounded long enough for bacterial decomposition. Permeability, depth to hard rock, slope, organic-matter content, coarse fragments, and the reservoir site material are important considerations. In addition to these, the susceptibility to damage by flooding should be considered, since many desirable sites are near or adjacent to flood plains.

Recreational facilities.--The facilities rated in table 4 are campsites, picnic grounds, and intensive play areas. The potential for recreational facilities in the survey area is almost unlimited for camping, trailer parking, picnicking, fishing, hiking, and swimming (pls. V, bottom; VI, top). The numbers of campsites, picnic areas, hiking trails, and scenic sites developed and planned in the U.S. Forest Service area are 15 in Dawson County, 75 in Lumpkin County, and 42 in White County. These areas vary in size from 1 to 50 acres.

Two State parks offering similar recreation facilities are Amicalola Falls State Park in Dawson County and Unicoi State Park in White County. Each has 20 cabins available for public rental. In addition, there are a number of private camps in the survey area that have similar facilities for rent (pl. VI, bottom).

Campsites.--In this survey area, campsites are areas suitable for tents and for outdoor living accommodations for a period of at least one week. Little site preparation should be needed. The suitability for sewage disposal is not a part of this rating, since this is considered as a separate use. Soil properties important in this evaluation are slope and the trafficability of the soil as influenced by boulders, cobblestones, stones, and a sticky surface layer or coarse sandy surface layer.

Picnic areas.--These are places that are suitable for pleasure outings at which a meal is eaten. Such facilities as tables and fireplaces generally are furnished. The chief soil requirements are much the same as for campsites. However, steeper slopes can be allowed without reducing the desirability.

Intensive play areas.--Intensive play areas are developed playgrounds for organized games such as baseball, tennis, and volleyball. These areas are subject to much foot traffic and generally require a nearly level surface with good drainage and a texture that withstands much traffic. Slope, depth to hard rock, and trafficability are important in evaluating soil for this use.

Gardens.--In the three-county area, gardens include areas for the production of both vegetables and flowers for the home. Properties important in evaluating soils for this use are productivity,

depth to water table, flood hazard, available water capacity, workability, slope, and permeability.

Structures for light industry.--These structures include buildings that are used for stores, offices, and small industries. None of these structures are more than three stories high. It is assumed that sewage disposal facilities are available. The properties important in evaluating soils for this use are slope, depth to water table, flood hazard, the capacity to support loads, and shrink-swell potential.

Trafficways.--This use refers to low-cost roads and residential streets. The construction involves limited cut and fill and limited preparation of subgrade. Important considerations for trafficways include slope, depth to water table, flood hazard, inherent erodibility, traffic-supporting capacity, and depth to hard rock.

TABLE 7.--LIMITATIONS OF THE SOILS

(Gullied land and Rock

Soil and map symbol	Foundations for dwellings	Sewage disposal systems	
		Septic tank filter fields	Oxidation ponds
Appling sandy loam, 6 to 10 percent slopes, eroded (AmC2).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope---------
Ashe stony loam, 60 to 90 percent slopes (AcG).	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Ashe and Edneyville stony loams, 10 to 25 percent slopes (AEE).	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Ashe and Edneyville stony loams, 25 to 60 percent slopes (AEF).	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Augusta fine sandy loam, 2 to 6 percent slopes (AwB).	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Augusta fine sandy loam, 6 to 10 percent slopes (AwC).	Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: slope---------
Buncombe loamy sand (Bfs)----------	Severe: flood hazard.	Severe: flood hazard.	Severe: rapid permeability.
Burton loam, 15 to 50 percent slopes (BvF).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Cartecay complex (Cac)----------	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Chandler loam, 25 to 60 percent slopes (CCF).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Congaree and Starr soils (Con)----------	Severe: flood hazard.	Severe: flood hazard.	Severe: flood hazard--
Edneyville and Porters loams, 10 to 15 percent slopes (EPD).	Moderate: slope-----	Moderate: slope-----	Severe: slope---------
Edneyville and Porters loams, 15 to 25 percent slopes (EPE).	Severe: slope-------	Severe: slope-------	Severe: slope---------

land are not rated)

Recreational facilities			Gardens	Structures for light industry	Trafficways
Campsites	Picnic areas	Intensive play areas			
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: slope; moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Severe: seasonal high water table.	Severe: seasonal high water table.	Severe: seasonal high water table; slope.	Moderate: seasonal high water table.	Severe: seasonal high water table.	Moderate: seasonal high water table; fair traffic-supporting capacity.
Moderate to severe: flooding; sandy surface layer.	Moderate: fair trafficability.	Moderate to severe: flooding; fair trafficability.	Moderate: sandy texture.	Severe: subject to flooding.	Severe: subject to flooding.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope--	Severe: slope--	Severe: slope.
Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Severe: slope---	Moderate: slope-	Severe: slope---	Severe: slope--	Severe: slope--	Severe: slope.
Severe: flood hazard.	Moderate: flood hazard.	Severe: flood hazard.	Moderate: seasonal flood hazard.	Severe: flood hazard.	Severe: flood hazard.
Moderate: slope-	Moderate: slope-	Severe: slope---	Moderate: slope-	Severe: slope--	Moderate: slope.
Severe: slope; fair trafficability.	Moderate: slope; fair trafficability.	Severe: slope; fair trafficability.	Severe: slope--	Severe: slope--	Moderate: slope; fair traffic-supporting capacity.

Soil and map symbol	Foundations for dwellings	Sewage disposal systems	
		Septic tank filter fields	Oxidation ponds
Edneyville and Porters loams, 25 to 60 percent slopes (EPF).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Edneyville and Porters loams, 60 to 80 percent slopes (EPG).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Fannin fine sandy loam, 2 to 6 percent slopes (FaB).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Moderate: moderate permeability; slope.
Fannin fine sandy loam, 6 to 10 percent slopes (FaC).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope---------
Fannin fine sandy loam, 10 to 25 percent slopes (FaE).	Moderate to severe: slope.	Severe: slope-------	Severe: slope---------
Fannin sandy clay loam, 6 to 10 percent slopes, eroded (FbC2).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope---------
Fannin sandy clay loam, 10 to 25 percent slopes, eroded (FbE2).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Fannin soils, 25 to 60 percent slopes (FcF).	Severe: slope-------	Severe: slope-------	Severe: slope---------
Hayesville sandy loam, 2 to 6 percent slopes (HIB).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Moderate: moderate permeability; slope.
Hayesville sandy loam, 6 to 10 percent slopes (HIC).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope---------
Hayesville sandy loam, 10 to 25 percent slopes (HIE).	Moderate to severe: slope.	Severe: slope-------	Severe: slope---------
Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded (HJC3).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope---------

Recreational facilities			Gardens	Structures for light industry	Trafficways
Campsites	Picnic areas	Intensive play areas			
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Slight----------	Slight----------	Slight----------	Slight----------	Moderate: moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: slope; moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Moderate to severe: slope---	Moderate to severe: slope---	Severe: slope---	Moderate: slope-	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Moderate: slope; fair trafficability.	Moderate: fair trafficability.	Severe: slope; fair trafficability.	Moderate: slope; erodibility.	Moderate: moderate shrink-swell potential; slope.	Moderate: moderate shrink-swell potential; fair traffic-supporting capacity.
Moderate to severe: slope; fair trafficability.	Moderate to severe: slope; fair trafficability.	Severe: slope---	Severe: slope; erodibility.	Severe: slope---	Moderate to severe: fair traffic-supporting capacity.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Slight----------	Slight----------	Slight----------	Slight----------	Moderate: moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: slope; moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---	Severe: slope---	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Moderate: slope; fair trafficability.	Moderate: fair trafficability.	Severe: slope---	Moderate: slope; moderately severe to severe erodibility.	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.

Soil and map symbol	Foundations for dwellings	Sewage disposal systems	
		Septic tank filter fields	Oxidation ponds
Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded (HJE3).	Severe: slope--------	Severe: slope--------	Severe: slope--------
Hayesville and Rabun loams, 6 to 10 percent slopes (HLC).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope--------
Hayesville and Rabun loams, 10 to 15 percent slopes (HLD).	Moderate: slope-----	Severe: slope--------	Severe: slope--------
Hayesville and Rabun loams, 25 to 60 percent slopes (HLF).	Severe: slope-------	Severe: slope--------	Severe: slope--------
Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded (HKC3).	Slight----------	Moderate: percolation rate is 45 to 75 minutes per inch.	Severe: slope--------
Hiwassee loam, 2 to 10 percent slopes (HSC).	Slight----------	Slight to moderate; moderate permeability.	Moderate to severe: slope.
Hiwassee loam, 10 to 15 percent slopes (HSD).	Moderate: slope-----	Moderate: slope-----	Moderate: slope------
Hiwassee loam, 15 to 40 percent slopes (HSF).	Severe: slope-------	Severe: slope--------	Severe: slope--------
Masada fine sandy loam, 2 to 6 percent slopes (MoB).	Slight----------	Slight----------	Moderate: moderate permeability.
Masada fine sandy loam, 2 to 6 percent slopes, eroded (MoB2).	Slight----------	Slight----------	Moderate: moderate permeability.
Masada fine sandy loam, 6 to 10 percent slopes, eroded (MoC2).	Slight----------	Slight----------	Severe: slope--------
Masada fine sandy loam, 10 to 15 percent slopes, eroded (MoD2).	Moderate: slope------	Moderate: slope------	Severe: slope--------
Musella cobbly loam, 6 to 25 percent slopes (MCE).	Severe: slope; cobblestones on the surface.	Severe: slope; weathered rock at depth of about 48 inches.	Severe: slope; cobblestones on the surface.

Recreational facilities			Gardens	Structures for light industry	Trafficways
Campsites	Picnic areas	Intensive play areas			
Moderate to severe: slope; fair trafficability.	Moderate to severe: slope; fair trafficability.	Severe: slope---	Severe: slope---	Severe: slope---	Moderate: slope; fair traffic-supporting capacity.
Slight to moderate: slope; fair trafficability.	Slight to moderate: fair trafficability.	Severe: slope---	Moderate: slope; erodibility.	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---	Moderate: slope-	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Moderate: slope; fair trafficability.	Moderate: slope; fair trafficability.	Severe: slope---	Moderate: slope; moderately severe to severe erodibility.	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.
Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate to severe: fair trafficability; slope.	Slight: 2 to 6 percent slopes. Moderate: 6 to 10 percent slopes.	Moderate: moderate shrink-swell potential.	Moderate: poor to fair traffic-supporting capacity.
Moderate: slope-	Moderate: slope-	Severe: slope---	Moderate: slope-	Moderate: slope-	Moderate to severe: slope; poor to fair traffic-supporting capacity.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Slight----------	Slight----------	Slight----------	Slight----------	Moderate: moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Slight----------	Slight----------	Slight----------	Slight----------	Moderate: moderate shrink-swell potential.	Moderate: fair traffic-supporting capacity.
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.
Moderate: slope-	Moderate: slope-	Severe: slope---	Severe: slope---	Severe: slope---	Moderate: slope.
Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.

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Soil and map symbol	Foundations for dwellings	Sewage disposal systems	
		Septic tank filter fields	Oxidation ponds
Musella cobbly loam, 25 to 70 percent slopes (MCG).	Severe: slope; cobblestones on the surface.	Severe: slope; weathered rock at depth of about 48 inches.	Severe: slope; cobblestones on the surface.
Musella gravelly clay loam, 10 to 25 percent slopes, eroded (MuE2).	Moderate to severe: slope.	Severe: slope; weathered rock at depth of about 48 inches.	Severe: slope----------
Rabun loam, 15 to 25 percent slopes (RaE).	Moderate: slope------	Severe: slope--------	Severe: slope----------
Rabun clay loam, 10 to 15 percent slopes, severely eroded (RbD3).	Moderate: slope------	Moderate: slope------	Severe: slope----------
Rabun clay loam, 15 to 25 percent slopes, severely eroded (RbE3).	Severe: slope--------	Severe: slope--------	Severe: slope----------
Starr fine sandy loam (Sta)----------	Severe: flood hazard-	Severe: flood hazard-	Severe: flood hazard--
Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes (TbE).	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope----------
Tallapoosa fine sandy loam, 10 to 25 percent slopes (TcE).	Moderate to severe: slope.	Severe: slope----------	Severe: slope----------
Tallapoosa soils, 25 to 70 percent slopes (TdG).	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.
Toccoa soils (Toc)----------	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Tusquitee loam, 6 to 10 percent slopes (TlC).	Slight----------	Slight----------	Severe: slope----------
Tusquitee loam, 10 to 25 percent slopes (TlD).	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope----------

Recreational facilities			Gardens	Structures for light industry	Trafficways
Campsites	Picnic areas	Intensive play areas			
Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.
Moderate to severe: slope; fair trafficability.	Moderate to severe: slope; fair trafficability.	Severe: slope---	Severe: slope---	Severe: slope---	Moderate to severe: slope; weathered rock at depth of about 48 inches.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope; severe erodibility.	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Moderate: slope; fair trafficability.	Moderate: slope; fair trafficability.	Severe: slope---	Severe: slope---	Severe: slope---	Moderate: slope.
Severe: slope; poor trafficability.	Moderate: slope-	Severe: slope; poor trafficability.	Severe: slope---	Severe: slope---	Moderate: slope; fair traffic-supporting capacity.
Severe: flood hazard.	Moderate: flood hazard.	Severe: flood hazard.	Moderate: seasonal flood hazard.	Severe: flood hazard.	Severe: flood hazard.
Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Severe: slope; cobblestones on the surface.	Moderate to severe: slope; cobblestones on the surface.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---	Severe: slope; severe erodibility.	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.	Severe: slope; cobblestones or stones on the surface.
Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope; fair traffic-supporting capacity.

Soil and map symbol	Foundations for dwellings	Sewage disposal systems	
		Septic tank filter fields	Oxidation ponds
Tusquitee loam, 25 to 60 percent slopes (TlF).	Severe: slope--------	Severe: slope---------	Severe: slope---------
Tusquitee stony loam, 10 to 25 percent slopes (TmE).	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Tusquitee stony loam, 25 to 60 percent slopes (TmF).	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Wehadkee soils (Wed)----------	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Wickham fine sandy loam, 6 to 10 percent slopes (WgC).	Slight----------	Slight----------	Severe: slope---------
Wickham fine sandy loam, 10 to 25 percent slopes (WgD).	Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---------
Wickham fine sandy loam, 25 to 50 percent slopes (WgF).	Severe: slope--------	Severe: slope---------	Severe: slope---------
Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded (WnD3).	Moderate: slope------	Moderate: slope-------	Severe: slope---------

Recreational facilities			Gardens	Structures for light industry	Trafficways
Campsites	Picnic areas	Intensive play areas			
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.	Severe: slope; stones on the surface.
Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.	Severe: flood hazard; seasonal high water table.
Slight to moderate: slope.	Slight to moderate: slope.	Severe: slope---	Moderate: slope-	Moderate: moderate shrink-swell potential; slope.	Moderate: fair traffic-supporting capacity.
Moderate to severe: slope.	Moderate to severe: slope.	Severe: slope---	Severe: slope; severe erodibility.	Severe: slope---	Moderate to severe: slope; fair traffic-supporting capacity.
Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope---	Severe: slope.
Moderate: slope-	Moderate: slope-	Severe: slope---	Moderate: slope-	Severe: slope---	Moderate: slope.

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This section tells how the factors of soil formation have affected the development of soils in Dawson, Lumpkin, and White Counties. It also gives a brief explanation of the current soil classification system and places the soil series in some of the higher categories of that system.

Formation of Soils

Soils are produced when parent material, plants and animals, climate, and relief interact for a long period of time. These factors, plus time, largely determine the nature of the soil that forms at any point on the earth. All factors affect the formation of each soil, but the relative importance of each factor differs from place to place.

One of the factors may dominate in the formation of a soil and determine most of its properties. This is common where the parent material was derived from biotite gneiss, which is highly resistant to weathering. Soils formed in material from biotite gneiss commonly have thin horizons. The Ashe and Porters soils are examples of soils that formed in material weathered from this kind of rock.

The influence of time is illustrated in the formation of alluvial soils such as the Congaree and Toccoa. It is reasonable to assume that the alluvium in which these soils formed was washed from residual soils such as the Hayesville and Fannin. However, the profiles differ because of the nearly level topography of areas along streams that frequently overflow and deposit new soil material. Stratification is common, and little profile development exists at the present time. If these soils remain in place for a long period of time, a different drainage pattern will develop. Thus, flooding and the subsequent addition of soil material will be eliminated. If they are, it is expected that soils similar to Starr soils will develop. Therefore, for every soil, the combination of soil-forming factors determines the present characteristics of the soil.

Parent Material

Parent material, the unconsolidated mass of material in which a soil develops, is largely responsible for the chemical and mineralogical composition of soils. Dawson, Lumpkin, and White Counties are in the Blue Ridge Mountain and the Piedmont Plateau Provinces. Here, the parent material of most of the soils is residual; that is, the material weathered from the underlying rock. Only limited information is available on the geology and physiography of the survey area.

Five major rock formations occur in the survey area. The are granite gneiss, hornblende gneiss, biotite gneiss and schist, Ashland Schist, and quartzite (3). The texture of the soils that formed in materials weathered from these rocks ranges from sandy loam to clay.

Granite gneiss is an igneous rock that occurs at elevations of approximately 1,250 to 2,500 feet. The soils that formed in material derived from this rock range from moderately shallow to moderately deep, but small pockets of deep soils occur. Common soils derived from granite gneiss are the Hayesville, Fannin, and Tallapoosa soils.

Hornblende gneiss occurs at an elevation of approximately 1,300 to 3,500 feet. It occurs in a narrow band that begins east of Dawsonville and extends northeasterly into Lumpkin County. Soils that developed in material weathered from this rock are dark red, clayey, and shallow to moderately deep, but there are tongues and small pockets of deep soils. Common soils derived from hornblende gneiss are the Musella and the Rabun soils.

Biotite gneiss and schist occur at elevations of approximately 2,000 feet to 4,400 feet, the highest elevations in the survey area. These two kinds of rocks are located in the northern parts of Dawson and Lumpkin Counties, and in the southern and northern parts of White County.

A recent classification (3) shows that the oldest to the youngest of the rocks, in sequence, are mica schist with interbedded sillimanite-mica schist and sillimanite-biolite amphobile gneiss; mica schist with interbedded amphibolite gneiss; garnet-mica schist; quartzite and garnet amphibolite; and mica schist. Ashe, Porters, and Edneyville soils developed in material from biotite gneiss and schist in the Blue Ridge Province; Hayesville soils developed in the same kind of materials in the Piedmont Province.

The Ashland Schist, which contains mica gneiss and mica schist, occurs at elevations of approximately 1,400 to 3,000 feet. A continuous band runs northeasterly across the survey area starting in the southwestern corner of Dawson County, continuing through the southern part of Lumpkin County, and entering White County in the southwestern corner and extending through the northeastern corner. The Fannin, Tallapoosa, and Chandler soils formed in material weathered from this rock.

Quartzite occurs in the southeastern corner of Dawson County. This is a coarse-grained, muscovite-bearing rock of sedimentary origin. This rock resists erosion and is frequently used for road material. Soils derived from quartzite are generally shallow to moderately shallow, but there are tongues of moderately deep soil. Common soils formed in material weathered from this rock are the Tallapoosa soils.

Deposits along drainageways consist of stratified gravel, sand, and micaceous silt. The gravel content is greatest in the lower part of the deposit or where streams are in or near the mountains. The larger streams have broader flood plains and thicker deposits than the smaller streams. The soils that formed in colluvium and alluvium above the flood plains generally have few to common pebbles and cobblestones in the profile. The common soils along the flood plains are the Congaree, Cartecay, and Toccoa soils.

Plants and Animals

Plants, animals, bacteria, and other organisms are active in the soil-forming process. The changes that they bring about depend mainly on the kinds of life processes peculiar to each. The kinds of plants and animals that live in and on the soil are affected by the climate, parent material, relief, and age of the soil.

Most of the soils in this survey area formed under a forest consisting of a mixture of hardwoods and pines. Although both kinds of trees supply most of the organic matter available in the soils, the hardwoods contribute more. The content of the organic matter in most of the soils is low to medium.

Growing plants provide a cover that helps to reduce erosion and stabilize the surface so that the soil-forming processes can continue. Leaves, twigs, roots, and entire plants accumulate on the surface of forest soils and then decompose as the result of the actions of percolating water and of micro-organisms, earthworms, and other forms of life. The roots of plants widen cracks in the rocks and permit the entrance of more water. Also, the uprooting of trees by wind aids in mixing soil layers and loosening underlying material.

Small animals, earthworms, insects, and micro-organisms also influence soil formation. Small animals burrow into the soil and mix the layers. Earthworms and other small invertebrates, feeding on the organic matter in the upper few inches of the soil, slowly but continually mix the soil material and may alter it chemically. Bacteria, fungi, and other micro-organisms hasten the weathering of rocks and the decomposition of organic matter.

Climate

The climate of this survey area is mild and humid. The summers are long and mild; the winters are somewhat cold. This mild weather promotes the oxidation of iron in soils that have good internal drainage, encourages rapid decay of organic matter, and accelerates the decay of minerals, the dissolution of bases, and the translocation of clay. Water from the abundant rainfall leaches the permeable soils as it moves through them. This water also keeps some soils moist or saturated for long periods.

Although the climate is mild, some variations in average annual temperature exist between the higher mountain slopes in the north and the more gentle slopes in the south. Soils on the higher mountain peaks have a mean annual temperature of less than 59° F. Examples of these soils are the Porters, Tusquitee, and Ashe soils. At the lower elevations in the southern part of the survey area, soils such as those of the Appling and Masada series have a mean annual temperature of more than 59° F. These different climatic conditions affect the formation of soils through their influence on the rate of weathering of rocks, the decomposition of minerals and organic material, and the biological activity in the soil.

Relief

Relief, or the shape of the landscape, modifies the effects of climate and vegetation. It influences the formation of soils through its effect on drainage, erosion, temperature, and plant cover.

Streams have had a major role in dissecting and shaping the land surface. The landscapes are of four general kinds: a series of round-topped mountains; escarpments and very steep slopes; prominent hills near the base of mountains; and flat-topped hills in the southern part of the survey area and on the valley floor.

The round-topped mountains are dissected by many small streams formed by small springs. The small streams flow in the V-shaped valleys below strongly sloping to very steep side slopes. Here, the headwaters of many creeks, as well as of the Etowah River in Dawson County, the Chestatee River in Lumpkin County, and the Chattahoochee River in White County, are formed. In this area Tusquitee soils have developed in deposits of alluvial and colluvial materials in depressions along drainageways. Most of the residual soils developed in the round-topped mountains are well drained and moderately deep.

Rock beds, which produce many waterfalls and rapids, occur on the escarpments and very steep slopes between the Blue Ridge and Piedmont Provinces. Soils such as those of the Ashe, Chandler, and Edneyville series occur in this area. They are generally shallow to moderately deep, stony, and well drained to excessively drained.

Near the base of the mountains are prominent hills that have broken, narrow tops, steep to very steep side slopes, and V-shaped valleys in which rock beds cause many rapids in the streams. Hayesville and Fannin soils occur in these areas. These soils are generally moderately deep and well drained.

The flat-topped hills in the southern part of the survey area have narrow to fairly broad, broken, gently sloping to sloping, rounded ridgetops and sloping to steep sides. These hills are dissected by many drainageways and small streams. The Musella, Masada, and Hayesville soils occur in this area. These soils are moderately deep, and the water table is several feet below the surface.

The valleys range in width from only a few yards in the mountains to several hundred yards along the rivers and larger streams in the southern part of the survey area. The soils are mainly the Congaree, Toccoa, and Cartecay soils. They are adjacent to the streams and are subject to overflow several times during the year. The soils are stratified and are moderately well drained to somewhat poorly drained. In these areas the water table is usually less than 8 feet below the surface. On the broader valleys and adjacent steeper slopes the soils are generally well drained, have well-defined horizons, and have a water table at a depth of several feet. Many small springs occur near the heads and edges of the valleys. The drainage system of the survey area is characterized by a dendritic pattern. The larger streams flow in a southerly direction into

the Gulf of Mexico by way of the Chattahoochee and Etowah Rivers.

Time

Generally a long time is required for a soil to form. Differences in the length of time the parent material has been in place are reflected in the characteristics of the soil profile.

Although some soils in this survey area formed in recent alluvium and have not been in place for the time needed for distinct horizons to develop, most of the soils have developed distinct horizons. The surface layer of these soils contains an accumulation of organic matter. Silicate clay minerals have formed and moved downward to produce horizons that are relatively high in content of clay. In such soils oxidation or reduction of iron has had its effect, depending on natural drainage. Many of the soils have been well enough drained that they have a red or dark-red subsoil and contain highly oxidized iron. A few soils have had impeded drainage and have a gray subsoil that contains reduced iron. In addition, leaching of soluble calcium, magnesium, potassium, and other weatherable products has caused an increase in exchangeable hydrogen.

Soils may have essentially the same patent material but differ in degree of profile development, chiefly because of time. Two such soils are the Augusta soils on stream terraces and the Congaree soils on flood plains. These soils are similar in origin and occupy similar positions on the landscape. The Augusta soils have been in place long enough to have a distinct, dark-colored surface layer and a subsoil with an accumulation of clay. The Congaree soils, however, have not been in place long enough for distinct horizons to form or for much clay to accumulate.

Classification of Soils

Soils are classified so that their significant characteristics may be remembered more easily. Classification enables us to assemble knowledge about the soils, to see their relationship to one another and to the whole environment, and to develop principles that help us to understand their behavior and their response to manipulation. First through classification, and then through the use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

Thus in classification, soils are placed in narrow categories that are used in detailed soil surveys so that knowledge about the soils can be organized and applied in managing farms, fields, and woodlands; in developing rural areas; in performing engineering work; and in many other ways. They are placed in broad classes to facilitate study and comparison in large areas, such as countries and continents.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (11) and later revised (7).

The current system of classifying soils was placed in general use by the National Cooperative Soil Survey in 1965 (9). It is under continual study. Therefore, readers interested in developments of this system should refer to the latest literature available (6). The classes in the current system are briefly defined in the following paragraphs.

ORDER: Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Two exceptions, Entisols and Histosols, occur in many different climates.

Table 8 shows the soil orders in Dawson, Lumpkin, and White Counties--Entisols, Inceptisols, and Ultisols. Entisols are recent mineral soils that do not have genetic horizons or have only the beginnings of such horizons. Inceptisols are mineral soils in which horizons have definitely started to develop. They generally are on young, but not recent, land surfaces. Ultisols are mineral soils that have distinct horizons and are commonly on old land surfaces. They contain a clay-enriched B horizon that has low base saturation. The base saturation decreases with increasing depth.

SUBORDER: Each order is subdivided into suborders, primarily on the basis of those soil characteristics that seem to produce classes having the greatest genetic similarity. The suborders narrow the broad climatic range permitted in the orders. The criteria for suborders chiefly reflect either the presence or absence of waterlogging or soil differences resulting from the climate or vegetation. An example of a suborder is the Udults, a class within the order of Ultisols. It relates to soils that developed in humid climates. The suborder is not shown in table 8.

GREAT GROUP: Each suborder is divided into great groups according to the presence or absence of genetic horizons and the arrangement of these horizons. An example of a great group within the suborder of Udults is the Hapludults. The great group is not shown separately in table 8, because it is the last word in the name of the subgroup.

SUBGROUP: Each great group is subdivided into subgroups. One of these subgroups represents the central (typic) segment of the great group, and the others, called intergrades, have properties mostly of one great group and also one or more properties from another great group, suborder, or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example is the Typic Hapludults.

TABLE 8.--CLASSIFICATION OF SOIL SERIES IN DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA

Series	Family	Subgroup	Order
Appling-----	Clayey, kaolinitic, thermic----------	Typic Hapludults----------	Ultisols.
Ashe---------	Coarse-loamy, mixed, mesic----------	Typic Dystrochrepts---------	Inceptisols.
Augusta------	Fine-loamy, mixed, thermic----------	Aeric Ochraquults----------	Ultisols.
Buncombe-----	Mixed, thermic----------	Typic Udipsamments----------	Entisols.
Burton-------	Coarse-loamy, mixed, mesic----------	Typic Haplumbrepts----------	Inceptisols.
Cartecay-----	Coarse-loamy, mixed, nonacid, thermic-----	Aquic Udifluvents----------	Entisols.
Chandler-----	Coarse-loamy, micaceous, mesic----------	Typic Dystrochrepts----------	Inceptisols.
Congaree-----	Fine-loamy, mixed, nonacid, thermic-------	Typic Udifluvents----------	Entisols.
Edneyville---	Fine-loamy, mixed, mesic----------	Typic Hapludults----------	Ultisols.
Fannin-------	Fine-loamy, micaceous, mesic----------	Typic Hapludults----------	Ultisols.
Hayesville---	Clayey, kaolinitic, mesic----------	Typic Hapludults----------	Ultisols.
Hiwassee-----	Clayey, kaolinitic, thermic----------	Typic Hapludults----------	Ultisols.
Masada-------	Fine-loamy, mixed, thermic----------	Typic Hapludults----------	Ultisols.
Musella------	Fine-loamy, mixed, thermic----------	Typic Rhodudults----------	Ultisols.
Porters------	Fine-loamy, mixed, mesic----------	Humic Hapludults----------	Ultisols.
Rabun--------	Clayey, kaolinitic, mesic----------	Typic Rhodudults----------	Ultisols.
Starr--------	Fine-loamy, mixed, thermic----------	Fluventic Dystrochrepts------	Inceptisols.
Tallapoosa---	Loamy, micaceous, thermic, shallow--------	Ochreptic Hapludults---------	Ultisols.
Toccoa-------	Coarse-loamy, mixed, nonacid, thermic-----	Typic Udifluvents----------	Entisols.
Tusquitee----	Fine-loamy, mixed, mesic----------	Humic Hapludults----------	Ultisols.
Wehadkee-----	Fine-loamy, mixed, nonacid, thermic-------	Fluventic Haplaquepts--------	Inceptisols.
Wickham------	Fine-loamy, mixed, thermic----------	Typic Hapludults----------	Ultisols.

FAMILY: Each subgroup is divided into families, primarily on the basis of properties important to the growth of plants. Among the properties considered are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons. An example is a "clayey, kaolinitic, thermic family." This means that the clay content of the Bt horizon is greater than 35 percent, the mineralogy is kaolinite, and the mean annual soil temperature is greater than 59° F.

SERIES: The series consists of a group of soils that formed from a particular kind of parent material and that have genetic horizons that, except for texture of the surface soil, are similar in differentiating characteristics and arrangement in the soil profile. Among these characteristics are color, structure, reaction, consistence, and mineralogical and chemical composition. An example is the Hayesville series. In table 8, the soil series in the survey area are classified in some of the categories of the current system of soil classification.

ADDITIONAL FACTS ABOUT DAWSON, LUMPKIN, AND WHITE COUNTIES

This section tells about the climate, physiography, drainage, and water supply of the survey area and gives information about transportation and industry. Some information on organization, settlement, population, and farming is also included.

Organization, Settlement, and Population

Dawson County was established by the State Legislature in 1857. It was formed from parts of Forsyth, Gilmer, and Lumpkin Counties and was named for William C. Dawson, a Georgia civic leader. When the first census was taken in 1859 the population was 3,856. In 1964, the population was 3,508. Dawsonville, the county seat, had a population of 310 in 1964.

Lumpkin County was established in 1833. It consists of land acquired by treaty from the Cherokee Indians. The county was named for Governor Wilson Lumpkin. Soon after it was established, most of the county was divided into 40-acre tracts under the 1820 Lottery Act. When the first census was taken in 1840, the population was 5,671 people. In 1964, the population was 8,156. Dahlonega, the county seat, had a population of 2,740 in 1964.

White County was established in 1857 and consists of land that was formerly Habersham County. It was named for Major General White. When the first census was taken in 1860, the population was 3,315. The population in 1964 was 7,506. Cleveland is the county seat. It had a population of 657 people in 1960.

Discovery of gold in 1823 stimulated rapid settlement of Lumpkin County. Gold was mined extensively until the middle of the last century and on a smaller scale until around 1900. Small deposits of mica, iron, manganese, arsenopyrite, pyrite, graphite, ochre, kyanite, magnetite, and a number of other minerals are present but are not mined. A number of industrial and commercial sites are available throughout the survey area.

Climate [5/]

Dawson, Lumpkin, and White Counties are located along the southern slopes of the Blue Ridge Mountains, where the climate is characterized by mild summers, rather cold winters, and ample year-round precipitation. Table 9 gives temperature and precipitation data for the survey area. These data are fairly representative of the three counties.

5/ HORACE S. CARTER, State climatologist, National Weather Service, U.S. Department of Commerce, assisted with the preparation of this section.

TABLE 9.--TEMPERATURE AND PRECIPITATION DATA FOR DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with--		Average total	One year in 10 will have--	
			Maximum temperature equal to or higher than--	Minimum temperature equal to or lower than--		Less than--	More than--
	° F.	° F.	° F.	° F.	Inches	Inches	Inches
January	51.1	32.0	66	14	6.31	3.2	11.9
February	54.3	33.2	69	18	6.31	2.4	10.8
March	61.3	38.4	77	25	7.21	3.5	12.9
April	71.8	46.7	84	33	5.49	2.6	8.1
May	80.2	54.5	90	42	3.80	1.6	5.9
June	85.3	62.2	93	53	4.14	1.6	7.8
July	87.1	65.1	94	59	6.22	2.2	10.7
August	86.6	64.5	93	58	4.72	1.8	9.7
September	81.8	59.3	91	49	3.93	.9	7.8
October	72.2	48.3	84	34	3.17	.6	7.5
November	60.9	38.4	75	23	4.01	1.8	7.6
December	52.2	32.3	66	17	5.60	2.9	10.2
Year	70.4	47.9	95 [1/]	11 [1/]	60.91	49.1	76.0

1/ The extreme warm or cold temperature that will be equalled or exceeded on at least 4 days in 2 years out of 10.

Elevations in the three-county area generally range from approximately 1,200 feet in southern Dawson County to over 3,000 feet in the northern part of the three counties. Some of the peaks in northern Lumpkin County are over 4,000 feet.

The mountainous terrain has a marked influence on the summer climate. Daytime maximum temperatures are as high as 95° F. on less than one-third of the days in June, July, and August, and the temperature rarely reaches 100°. Records show that a temperature of 100° or higher has been recorded in Dahlonega only nine times in the last 75 years. A reading this high has not been experienced in Helen in 10 years of record. Minimum temperatures are probably affected even more by the elevation. Usually, there is rapid cooling after sunset and readings reach the low 60's by early morning. The average minimum for the three summer months is around 63°. It is very unusual for the temperature to remain above 70° throughout the night.

Winters are usually quite cold. The higher mountains to the north serve as a partial barrier to outbreaks of polar air masses, but this influence is offset by the effect of the elevation within the survey area. Also, because of the influence of elevation, winters are considerably colder in the northern part of the area than in the southern part. The number of days with minimum temperature of 32° F. or below ranges from about 65 days each winter in southern Dawson and Lumpkin Counties to more than 100 days in the higher northern sections. Readings of zero or below are rare in the south but occur in the higher mountains of the north during about half the winters.

The mountainous terrain also contributes to large differences in minimum temperature within short distances. On clear, still nights radiationally cooled air drains down the slopes and into valleys and other low areas to produce pockets of cold air. Under extreme conditions, early morning temperatures may be 10° to 15° lower in the valleys than on nearby slopes. The orientation of a large slope or hill will also influence its temperature regime. A south-facing slope receives more radiation from the sun than a north-facing slope and may have a significantly warmer microclimate. A knowledge of these terrain influences on local temperature may be quite important in temperature sensitive operations.

Table 10 shows the probability of freezing temperatures on or after given dates in spring and on or before given dates in fall. The dates are only approximate because the average freeze-free season varies considerably over the three-county area, owing to elevation and to local exposure. In the south the average dates of the last freeze in spring and the first in fall are early in April and late in October, respectively, giving an average freeze-free period of about 200 days. This period decreases to less than 170 days as elevations increase. Freezing has occurred at higher elevations late in May and in mid-September.

Annual precipitation differs greatly throughout the tri-county area. Yearly totals average between 55 and 60 inches in the Dawsonville area, but they increase to more than 75 inches at some of the higher elevations in northern Lumpkin and White Counties. Slope orientation, as well as elevation, may be responsible for large differences in rainfall totals within short distances. Since the major source of rain-producing moisture in the survey area is to the south and southeast, slopes facing in these directions generally receive more precipitation, on the average. Precipitation is fairly well distributed throughout the year. Winter and early spring are normally the rainiest seasons. October, usually the driest month, has an average rainfall of more than 3 inches. Although damaging dry spells are less frequent in the mountains than in other parts of the State, they do occasionally occur.

Snowfall contributes significantly to the winter precipitation totals in the northern part, and fairly large accumulations occur at the higher

TABLE 10.--PROBABILITIES OF LAST FREEZING TEMPERATURE IN SPRING AND FIRST FREEZING TEMPERATURE IN FALL

Probability	Dates for given probability at temperature of--		
	24° F. or lower	28° F. or lower	32° F. or lower
Spring:			
1 year in 10, later than----------	April 5	April 22	May 1.
2 years in 10, later than---------	April 2	April 13	April 30.
5 years in 10, later than---------	March 20	April 3	April 16.
Fall:			
1 year in 10, earlier than--------	November 1	October 20	October 9.
2 years in 10, earlier than-------	November 3	October 26	October 14.
5 years in 10, earlier than-------	November 14	November 10	October 22.

elevations during most winters. By contrast, many winters pass with little or no snow in the extreme southern part.

Windspeeds average slightly lower in the mountainous sections of northern Georgia than in most other parts of the State. Prevailing directions are quite variable because of the effect of the hilly terrain. Severe local storms with tornado characteristics occur, but they are less frequent than in the central and southern parts of Georgia. Thunderstorms occur quite frequently in spring and summer and are sometimes accompanied by locally damaging winds.

Physiography, Drainage, and Water Supply

Dawson, Lumpkin, and White Counties are within two broad physiographic provinces, probably of Precambrian age--the upper fringes of the Piedmont Plateau, and the Blue Ridge Province. The Piedmont Plateau is a series of prominent hills near the base of the mountains and larger streams, but it changes to flat-topped, undulating hills toward the south. The Blue Ridge Province is a series of prominent, round-crested mountains in the northwestern part of Dawson County, the northern part of Lumpkin County, and the central and northern parts of White County. The two provinces are generally separated by escarpments or steep slopes of 300 to 800 feet. Rocks are crystalline and complex, and they contain many kinds of diverse minerals. Most of the farmland in the survey area is in the Piedmont Plateau.

The Blue Ridge Province formed from highly metamorphosed masses of crystalline rock. The very steep slopes and escarpments of gneissic material are probably the result of ancient mountain-building forces. Erosion has not reduced elevations in these mountains, and they compare to elevations of the Piedmont Plateau. The topography is sloping to very steep, and there are few smooth areas. Most of the streams flow in V-shaped valleys.

The highest elevations of the tri-county area are 4,430 feet on Tray Mountain in White County; 3,867 feet on Cowrock Mountain in Lumpkin County; and 3,741 feet on Black Mountain in Dawson County. The lowest elevation in White County is 1,108 feet where the Chattahoochee River leaves the county in the southeast corner. The lowest elevation in Dawson and Lumpkin Counties is 1,100 feet where the Etowah and Chestatee Rivers leave the counties on the south side.

The drainage pattern in the survey area is dendritic. Streams form in the mountains in the northern part of the survey area and flow southward over rock beds that cause rapids and small falls. The headwaters of the Etowah River are in Dawson and Lumpkin Counties; the headwaters of the Chestatee River are in Lumpkin County; and the headwaters of the Chattahoochee River are in White County. Larger streams in Dawson County are Amicalola, Cockrans, Palmer, Proctor, and Shoal Creeks. Cane, Frogtown, Hurricane, Jones, Montgomery, and Tobacco Pouch Branch are in Lumpkin County. Blue, Brasstown, Chickamauga, Dodd, Dukes, Jenny, Sautee, Spoil Cane, Tesnatee, Turner, White, and York Creeks are in White County. All of the streams in the survey area carry water that eventually flows into the Gulf of Mexico.

Wells and springs supply adequate water for farm and home use. The wells are about 30 to 90 feet deep and supply water throughout the year. Small springs are common. Branches, creeks, large streams, and farm ponds are the main source of water for poultry and livestock. Wells, springs, and creeks supply water for the towns.

Industry, Transportation, and Markets

Industrial employment has increased greatly in Dawson, Lumpkin, and White Counties in recent years. At present, a much larger number of people are employed in industry than in farming. About 1,500 people are employed by industries, chiefly textile mills, sawmills, and garment factories located in Cleveland, Helen, Dawsonville, and Dahlonega. Many people commute 15 to 75 miles daily to jobs in Gainesville, Atlanta, or other nearby cities. Many families have one or more members employed in industry, but they farm on a part-time basis. Gainesville, 10 to 40 miles to the south, is the area marketplace for poultry products, livestock, pulpwood, and lumber.

Many U.S. and State highways serve the three-county area. These highways and many county roads are paved. Most unpaved county roads are surfaced with sandy or gravelly material and are serviceable throughout the year. One bus line provides daily passenger and parcel service throughout the survey area. Several motor freight lines operate in the area. The nearest commercial airports are at Athens and Atlanta.

Farming

Before the white settlers arrived in the area that is now Dawson, Lumpkin, and White Counties, the Cherokee Indians farmed some of the well-drained soils along the larger streams. Corn, beans, and potatoes were the main crops, as well as some tobacco. The Indians did not depend entirely on farming, however, and included fish, game, and wild fruit in their diet. After the settlers came, the land was cleared for corn, wheat, oats, barley, vegetables, and fruits. Methods and tools were crude, and only a few acres were cultivated on each farm.

The acreage in farms in the survey area increased steadily from 1833 to 1935. From 1935 to 1940, farm acreage decreased to 211,228 acres, but it reached a peak of 247,674 acres in 1950. By 1964, the three-county area had only 137,336 acres in farms. Most of the acreage that went out of farms has been acquired by timber companies or is now in Federal ownership as part of the Chattahoochee National Forest.

According to the U.S. Bureau of the Census, the number of farms in Dawson County decreased from 660 in 1950 to 327 in 1959, but increased to 339 by 1964. The average size of farms in Dawson County was 96 acres in 1959 and in 1964. About 46 percent of the farms are between 1 and 49 acres in size; 22 percent, between 50 and 99 acres; 29 percent, between 100 and 499 acres; and 3 percent are more than 500 acres.

The number of farms in Lumpkin County decreased from 789 in 1950 to 575 in 1959 and to 462 in 1964. The average size of farms in Lumpkin County was 90 acres in 1959 and 1964. About 48 percent of farms are between 1 and 49 acres; 26 percent, between 50 and 99 acres; 23 percent, between 100 and 499 acres; and 3 percent are more than 500 acres.

The number of farms in White County decreased from 949 in 1950 to 615 in 1959 and to 591 in 1964. The average size of farms in White County was 94 acres in 1959 and in 1964. About 46 percent of farms are between 1 and 49 acres in size; 25 percent, between 50 and 99 acres in size; 27 percent, between 100 and 499 acres; and 2 percent are more than 500 acres.

Cotton was the principal cash crop in the southern part of the survey area from around 1840 to 1940. Poultry and livestock farming have prevailed since 1940. Corn is the main row crop. Vegetables are grown mainly for home use, but a few farmers produce small quantities for markets.

Growing of row crops was the chief farm enterprise from the time this survey area was settled until early in 1940. The acreage used for row crops decreased significantly between 1940 and 1959. However, the acreage in forest and pasture increased. Now, only small areas are planted to row crops; these areas are mainly on well-drained first bottoms, low terraces, and the more fertile uplands.

Before 1945, pastures were located for the convenience of the farm operator. The suitability of soils for pasture was seldom considered. If an area was too steep or stony for cultivated crops, or if yields of row crops became very low, the area was fenced and used for pasture. In 1959, Dawson County had 1,814 acres of pasture. About two-thirds of this was improved pasture. Lumpkin County had 4,987 acres of pasture in 1959. One-half of this was improved pasture. In 1959, White County had 6,609 acres of pasture. Approximately two-thirds of this was improved. Each year an increasing acreage is being fertilized and seeded to adapted grasses. The availability of chicken litter for fertilizer and the low income from row crops are reasons that contribute to the increase of the acreage in pasture.

From 1950 to 1959, the number of cattle in Dawson County increased from 1,281 to 1,367; in Lumpkin County, from 1,627 to 3,071; and in White County, from 2,335 to 3,556. The increase was mostly in beef cattle. Most horses and mules have been replaced by tractors.

During the same period, the number of hogs in Dawson County decreased from 1,841 to 873; in Lumpkin County, the number of hogs increased from 1,554 to 2,372; and in White County, the number increased from 2,264 to 3,069. Most of the hogs are marketed locally.

Poultry has been important to the economy of this survey area since the early 1940's. Broilers were first produced in flocks of 500 to 1,000, but improved feeds, housing, equipment, and breeds make it possible for fewer producers to raise larger flocks. Flocks of 30,000 to 200,000 are now common. In 1959, the number of broilers produced in Dawson County was 3,748,650; in Lumpkin County, 5,165,605; and in White County, 8,067,374. There has been a slight increase in broiler production in this survey area since 1959.

Around three-fourths of Dawson County, two-thirds of Lumpkin County, and two-thirds of White County are in woods. The value of timber products should increase from year to year as better management is practiced.

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GLOSSARY

Acidity, soil. See Reaction, soil.

Aggregate (soil structure). Many fine particles held in a single mass or cluster, such as a clod, crumb, block, or prism.

Alluvium. Fine material, such as sand, silt, or clay, that have been deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern.

Available water capacity. The capability of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of water at field capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

Bedrock. The solid rock that underlies the soil and other unconsolidated material, or that is exposed at the surface.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Cobblestone. A rounded or partly rounded fragment of rock, 3 to 10 inches in diameter.

Colluvium. Soil material, fragments of rock, or both, moved by creep, slide, or local wash, and deposited at the base of steep slopes.

Concretions. Hard grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds that cement the soil grains together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are--

Loose.--Noncoherent; will not hold together in a mass.

Friable.--When moist, crushes easily under gentle to moderate pressure between thumb and forefinger and can be pressed together into a lump.

Firm.--When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.--When wet, is readily deformed by moderate pressure but can be pressed into a lump; will form a wire when rolled between thumb and forefinger.

Sticky.--When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than pull free from other material.

Hard.--When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.--When dry, breaks into powder or individual grains under very slight pressure.

Cemented.--Hard and brittle; little affected by moistening.

Contour farming. Plowing, cultivating, planting, and harvesting in rows that are at right angles to the natural direction of the slope or that are parallel to terrace grade.

Contour stripcropping. Growing crops in strips that follow the contour or are parallel to terraces or diversions. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Cover crop. A close-growing crop grown primarily to improve and to protect the soil between periods of regular crop production; or a crop grown between trees and vines in orchards and vineyards.

Dendritic. Branched like a tree or shrub; used to describe a river or natural drainage system.

Drainage, surface. Runoff, or surface flow, of water from an area.

Eluviation. The movement of material from one place to another within the soil, either in true solution or in colloidal suspension. Soil horizons that have lost material through eluviation are said to be eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by wind, running water, and other geological agents.

Fertility, soil. The quality of a soil that enables it to provide compounds, in adequate amounts and in proper balance, for the growth of specified plants, when other growth factors, such as light, moisture, temperature, and the physical condition (or tilth) of the soil, are favorable.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. Nearly level land, consisting of stream sediments, that borders a stream and is subject to flooding unless protected artificially.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rains. The distinction between gully and rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by normal tillage; whereas, a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardwoods. Broad-leaved deciduous trees, or the wood from them, regardless of texture.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.--The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.--The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.--The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has (1) distinctive characteristics caused by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.--The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer.--Consolidated rock beneath the soil. The rock generally underlies a C horizon but may be immediately beneath an A or B horizon.

Igneous rock. Rock that has been formed by the cooling of molten mineral material. Examples are granite, syenite, diorite, and gabbro.

Illuviation. The accumulation of material in a soil horizon through the deposition of suspended material and organic matter removed from horizons above. Since part of the fine clay in the B horizon (or subsoil) of many soils has moved into the B horizon from the A horizon above, the B horizon is called an illuvial horizon.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given

instant, usually expressed in inches per hour. It may be limited either by the infiltration capacity of the soil or by the rate at which water is applied to the surface soil.

Intensive cropping. Maximum use of the land through the frequent growing of harvested crops.

Leaching. The removal of soluble materials from soils or other material by percolating water.

Metamorphic rock. A rock of any origin that has been changed physically by heat, pressure, and movement. Igneous and sedimentary rocks may be changed to metamorphic rock, or one metamorphic rock may be changed to another. Examples are gneiss, schist, and slate.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils generally indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance--few, common, and many; size--fine, medium and coarse; and contrast--faint, distinct, and prominent. The size measurements are these: Fine, less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; medium, ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and coarse, more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Munsell notation. A system for designating color by degrees of the three simple variables--hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with a hue of 10YR, value of 6, and a chroma of 4.

Organic matter. A general term for plant and animal material, in or on the soil, in all stages of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Overstory. The trees in a forest that form the upper crown cover. Contrasts with understory.

Parent material. The disintegrated and partly weathered rock from which soil has formed.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

pH. A numerical means for designating relatively weak acidity and alkalinity, as in soils and other biological systems. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity. Also see Reaction, soil.

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are: very slow, slow, moderately slow, moderate, moderately rapid, rapid, and very rapid.

Plow layer. The soil ordinarily moved in tillage; equivalent to surface soil.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material. See also Horizon, soil.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction, because it is neither acid nor alkaline. In words, the degree of acidity or alkalinity is expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residual material. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material in which a soil has formed.

Rill. A steep-sided channel resulting from accelerated erosion. A rill normally is a few inches in depth and width and is not large enough to be an obstacle to farm machinery.

Root zone. The part of the soil that is penetrated, or can be penetrated, by plant roots.

Row crops. A crop planted in rows, generally 2 to 4 feet apart, so as to allow cultivation between rows during the growing season.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting upon parent material, as conditioned by relief over periods of time.

Solum (pl. sola). The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying parent material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stones. Rock fragments greater than 10 inches in diameter if rounded, and greater than 15 inches along the longer axis if flat.

Stony. Used to describe soils that contain stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips, or bands, to serve as vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are--platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are (1) single grain (each grain by itself, as in dune sand) or (2) massive (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Surface layer. A term used in nontechnical soil descriptions for one or more layers above the subsoil. Includes A horizon and part of B horizon; has no depth limit.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. (See also Clay, Sand, and Silt.) The basic textural classes, in order of increasing proportions of fine particles, are as follows: Sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil. A presumed fertile soil or soil material, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land consisting of material unworked by water in recent geologic time and lying, in general, at a higher elevation than the alluvial plain or stream terrace. Land above the lowlands along rivers.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. Other information is given in tables as follows:

Acreage and extent, table 1, p. 7.
Estimated acre yields, table 2, p. 46.
Woodland, table 6, p. 52.
Engineering uses of the soils, table 4, p. 62, and tables 5 and 6, pp. 70 through 76.
Wildlife, table 7, p. 84.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
AcG	Ashe stony loam, 60 to 90 percent slopes	11	VIIs-1	44	4	51	5
AEE	Ashe and Edneyville stony loams, 10 to 25 percent slopes	11	VIIs-1	44	5	51	5
AEF	Ashe and Edneyville stony loams, 25 to 60 percent slopes	11	VIIs-1	44	4	51	5
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded	10	IIIe-2	39	11	58	1
AwB	Augusta fine sandy loam, 2 to 6 percent slopes	12	IIIw-3	40	2	51	6
AwC	Augusta fine sandy loam, 6 to 10 percent slopes	13	VIe-2	43	2	51	6
Bfs	Buncombe loamy sand	13	IIIs-1	41	1	51	6
BvF	Burton loam, 15 to 50 percent slopes	14	VIIe-1	43	7	51	4
Cac	Cartecay complex	15	IIIw-2	40	2	51	6
CCF	Chandler loam, 25 to 60 percent slopes	15	VIIe-2	43	12	58	5
Con	Congaree and Starr soils	16	IIw-2	38	1	51	6
EPD	Edneyville and Porters loams, 10 to 15 percent slopes	17	IVe-1	41	5	51	5
EPE	Edneyville and Porters loams, 15 to 25 percent slopes	17	VIe-1	42	5	51	5
EPF	Edneyville and Porters loams, 25 to 60 percent slopes	17	VIIe-1	43	6	51	5
EPG	Edneyville and Porters loams, 60 to 80 percent slopes	18	VIIe-1	43	6	51	5
FaB	Fannin fine sandy loam, 2 to 6 percent slopes	18	IIe-3	38	13	58	1
FaC	Fannin fine sandy loam, 6 to 10 percent slopes	19	IIIe-3	40	13	58	1
FaE	Fannin fine sandy loam, 10 to 25 percent slopes	19	VIe-1	42	13	58	2
FbC2	Fannin sandy clay loam, 6 to 10 percent slopes, eroded	19	IVe-2	42	14	58	3
FbE2	Fannin sandy clay loam, 10 to 25 percent slopes, eroded	19	VIe-1	42	14	58	3
FcF	Fannin soils, 25 to 60 percent slopes	19	VIIe-1	43	14	58	4
Gul	Gullied land	20	VIIe-4	44	--	--	--
HIB	Hayesville sandy loam, 2 to 6 percent slopes	21	IIe-2	38	11	58	1
HIC	Hayesville sandy loam, 6 to 10 percent slopes	21	IIIe-2	39	11	58	1
HIE	Hayesville sandy loam, 10 to 25 percent slopes	21	IVe-1	41	11	58	2
HJC3	Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded	21	IVe-1	41	14	58	3
HJE3	Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded	21	VIe-1	42	14	58	3
HKC3	Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded	22	IVe-1	41	14	58	3
HLC	Hayesville and Rabun loams, 6 to 10 percent slopes	22	IIIe-2	39	9	58	1
HLD	Hayesville and Rabun loams, 10 to 15 percent slopes	22	IVe-1	41	9	58	2
HLF	Hayesville and Rabun loams, 25 to 60 percent slopes	22	VIIe-1	43	9	58	4
HSC	Hiwassee loam, 2 to 10 percent slopes	23	IIIe-1	39	8	58	1
HSD	Hiwassee loam, 10 to 15 percent slopes	24	IVe-1	41	8	58	2
HSF	Hiwassee loam, 15 to 40 percent slopes	24	VIIe-1	43	8	58	4
MCE	Musella cobbly loam, 6 to 25 percent slopes	26	VIIe-2	43	10	58	5
MCG	Musella cobbly loam, 25 to 70 percent slopes	26	VIIe-2	43	10	58	5
MoB	Masada fine sandy loam, 2 to 6 percent slopes	25	IIe-2	38	3	51	1
MoB2	Masada fine sandy loam, 2 to 6 percent slopes, eroded	25	IIe-2	38	3	51	1
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded	25	IIIe-2	39	3	51	1
MoD2	Masada fine sandy loam, 10 to 15 percent slopes, eroded	25	IVe-1	41	3	51	2
MuE2	Musella gravelly clay loam, 10 to 25 percent slopes, eroded	27	VIe-4	43	14	58	5
RaE	Rabun loam, 15 to 25 percent slopes	28	IVe-1	41	9	58	4
RbD3	Rabun clay loam, 10 to 15 percent slopes, severely eroded	29	VIe-1	42	14	58	3
RbE3	Rabun clay loam, 15 to 25 percent slopes, severely eroded	29	VIe-1	42	14	58	3
Roc	Rock Land	29	VIIIs-1	44	--	--	--
Sta	Starr fine sandy loam	30	I-1	37	1	51	6
TbE	Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes	31	VIIs-1	44	12	58	5

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GUIDE TO MAPPING UNITS--Cont.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group		Wildlife group
			Symbol	Page	Number	Page	Number
TcE	Tallapoosa fine sandy loam, 10 to 25 percent slopes	31	VIIs-1	44	12	58	5
TdG	Tallapoosa soils, 25 to 70 percent slopes	31	VIIs-1	44	12	58	5
TlC	Tusquitee loam, 6 to 10 percent slopes	33	IIIe-1	39	7	51	1
TlD	Tusquitee loam, 10 to 25 percent slopes	33	IVe-1	41	7	51	2
TLF	Tusquitee loam, 25 to 60 percent slopes	33	VIIe-1	43	7	51	4
TmE	Tusquitee stony loam, 10 to 25 percent slopes	33	VIIs-1	44	7	51	2
TmF	Tusquitee stony loam, 25 to 60 percent slopes	34	VIIs-1	44	7	51	5
Toc	Toccoa soils	32	IIw-2	38	1	51	6
Wed	Wehadkee soils	34	IVw-1	42	2	51	6
WgC	Wickham fine sandy loam, 6 to 10 percent slopes	35	IIIe-1	39	3	51	1
WgD	Wickham fine sandy loam, 10 to 25 percent slopes	35	IVe-1	41	3	51	2
WgF	Wickham fine sandy loam, 25 to 50 percent slopes	36	VIIe-1	43	7	51	4
WnD3	Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded	36	VIe-2	43	14	58	3

U.S. DEPARTMENT OF AGRICULTURE

Washington, D.C. 20250

Soil Survey of Dawson, Lumpkin, and White Counties, Georgia

E R R A T A

Guide to Mapping Units, headnote. Woodland, table 6, p. 52 should read as follows: Woodland, table 3, p. 52. Engineering uses of the soils, table 4, p. 62, and tables 5 and 6, pp. 70 through 76 should read as follows: Engineering uses of the soils, table 4, p. 62, and tables 5 and 6, pp. 70 through 81. Wildlife, table 7, p. 84 should read as follows: Town and Country Planning, table 7, p. 84.

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U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE AND FOREST SERVICE

UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE,
AGRICULTURAL EXPERIMENT STATIONS

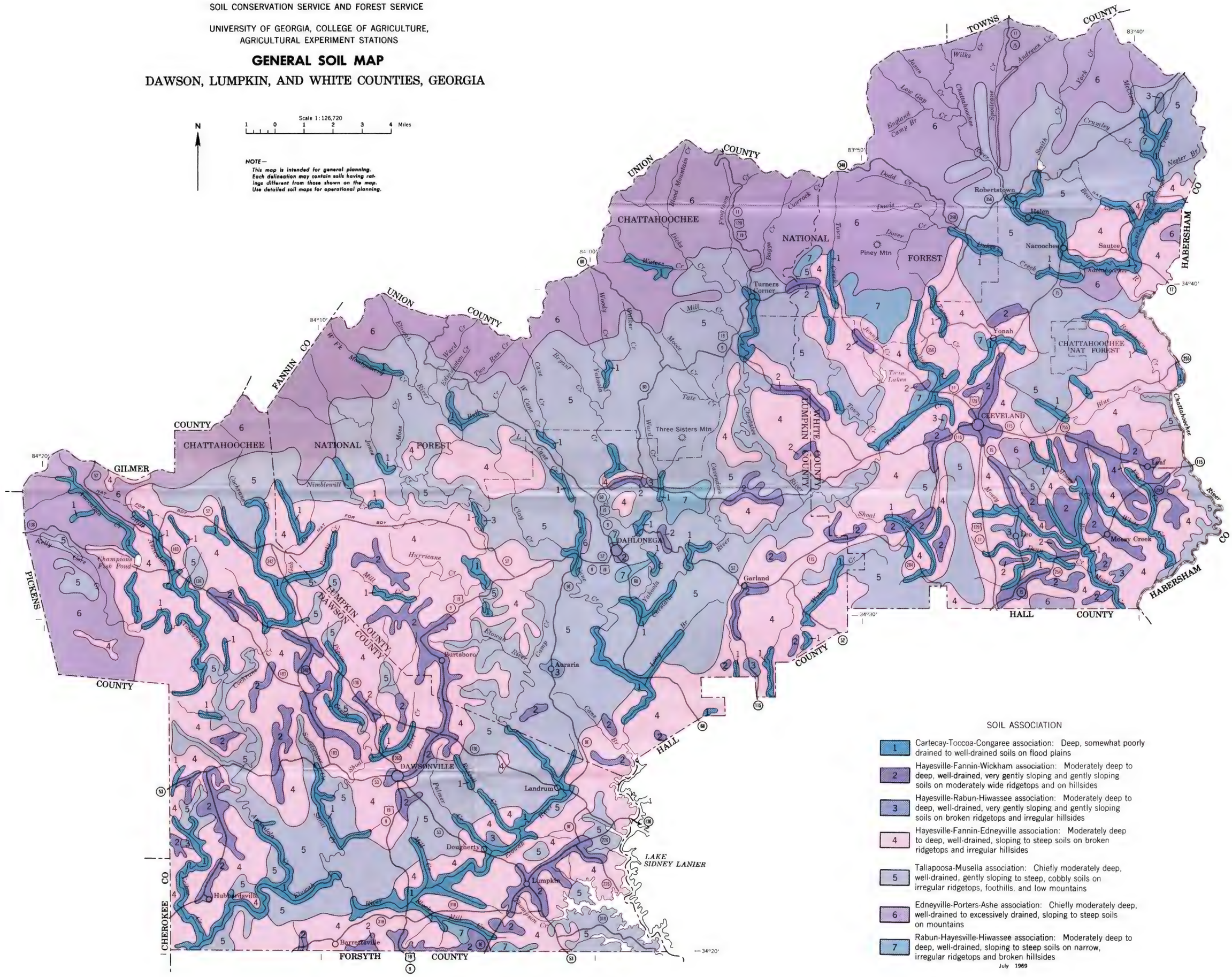
GENERAL SOIL MAP

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA

N

Scale 1:126,720
1 0 1 2 3 4 Miles

NOTE—
This map is intended for general planning. Each delineation may contain soils having ratings different from those shown on the map. Use detailed soil maps for operational planning.



SOIL ASSOCIATION

1 Cartecay-Toccoa-Congaree association: Deep, somewhat poorly drained to well-drained soils on flood plains

2 Hayesville-Fannin-Wickham association: Moderately deep to deep, well-drained, very gently sloping and gently sloping soils on moderately wide ridgetops and on hillsides

3 Hayesville-Rabun-Hiwassee association: Moderately deep to deep, well-drained, very gently sloping and gently sloping soils on broken ridgetops and irregular hillsides

4 Hayesville-Fannin-Edneyville association: Moderately deep to deep, well-drained, sloping to steep soils on broken ridgetops and irregular hillsides

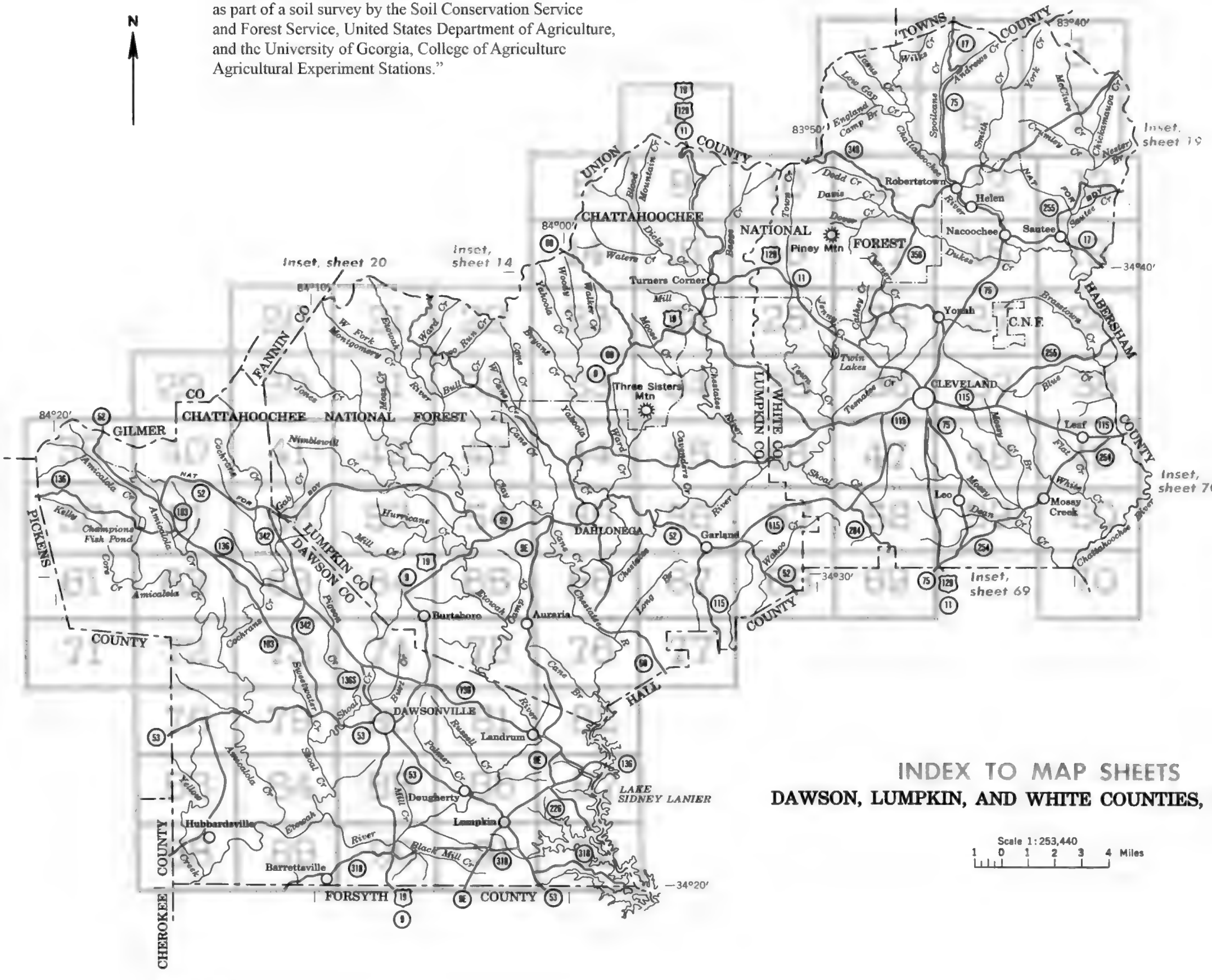
5 Tallapoosa-Musella association: Chiefly moderately deep, well-drained, gently sloping to steep, cobbly soils on irregular ridgetops, foothills, and low mountains

6 Edneyville-Porters-Ashe association: Chiefly moderately deep, well-drained to excessively drained, sloping to steep soils on mountains

7 Rabun-Hayesville-Hiwassee association: Moderately deep to deep, well-drained, sloping to steep soils on narrow, irregular ridgetops and broken hillsides

July 1969

Original text from each map sheet:
"This map is one of a set compiled in 1968
as part of a soil survey by the Soil Conservation Service
and Forest Service, United States Department of Agriculture,
and the University of Georgia, College of Agriculture
Agricultural Experiment Stations."



INDEX TO MAP SHEETS

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA

Scale 1:253,440

1 0 1 2 3 4 Miles

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE AND FOREST SERVICE

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA

UNIVERSITY OF GEORGIA, COLLEGE OF AGRICULTURE
AGRICULTURAL EXPERIMENT STATIONS

SOIL LEGEND

The first letter in each symbol is the initial one of the soil name. If the third letter is a capital, it shows the range of slope from B, 2 to 6 percent, to G, 60 to 90 percent. A number after the slope letter denotes the class of erosion as given in the soil name.

SYMBOL	NAME
AcG	Ashe stony loam, 60 to 90 percent slopes
AEE	Ashe and Edneyville stony loams, 10 to 25 percent slopes
AEF	Ashe and Edneyville stony loams, 25 to 60 percent slopes
AmC2	Appling sandy loam, 6 to 10 percent slopes, eroded
AwB	Augusta fine sandy loam, 2 to 6 percent slopes
AwC	Augusta fine sandy loam, 6 to 10 percent slopes
Bfs	Buncombe loamy sand
BvF	Burton loam, 15 to 50 percent slopes
Cac	Cartecay complex
CCF	Chandler loam, 25 to 60 percent slopes
Con	Congaree and Starr soils
EPD	Edneyville and Porters loams, 10 to 15 percent slopes
EPE	Edneyville and Porters loams, 15 to 25 percent slopes
EPF	Edneyville and Porters loams, 25 to 60 percent slopes
EPG	Edneyville and Porters loams, 60 to 80 percent slopes
FaB	Fannin fine sandy loam, 2 to 6 percent slopes
FaC	Fannin fine sandy loam, 6 to 10 percent slopes
FaE	Fannin fine sandy loam, 10 to 25 percent slopes
FbC2	Fannin sandy clay loam, 6 to 10 percent slopes, eroded
FbE2	Fannin sandy clay loam, 10 to 25 percent slopes, eroded
FcF	Fannin soils, 25 to 60 percent slopes
Gul	Gullied land
HlB	Hayesville sandy loam, 2 to 6 percent slopes
HlC	Hayesville sandy loam, 6 to 10 percent slopes
HlE	Hayesville sandy loam, 10 to 25 percent slopes
HJC3	Hayesville sandy clay loam, 6 to 10 percent slopes, severely eroded
HJE3	Hayesville sandy clay loam, 10 to 25 percent slopes, severely eroded
HKC3	Hayesville and Rabun clay loams, 6 to 10 percent slopes, severely eroded
HLC	Hayesville and Rabun loams, 6 to 10 percent slopes
HLD	Hayesville and Rabun loams, 10 to 15 percent slopes
HLF	Hayesville and Rabun loams, 25 to 60 percent slopes
HSC	Hiwassee loam, 2 to 10 percent slopes
HSD	Hiwassee loam, 10 to 15 percent slopes
HSF	Hiwassee loam, 15 to 40 percent slopes
MCE	Musella cobbly loam, 6 to 25 percent slopes
MCG	Musella cobbly loam, 25 to 70 percent slopes
MoB	Masada fine sandy loam, 2 to 6 percent slopes
MoB2	Masada fine sandy loam, 2 to 6 percent slopes, eroded
MoC2	Masada fine sandy loam, 6 to 10 percent slopes, eroded
MoD2	Masada fine sandy loam, 10 to 15 percent slopes, eroded
MuE2	Musella gravelly clay loam, 10 to 25 percent slopes, eroded
RaE	Rabun loam, 15 to 25 percent slopes
RbD3	Rabun clay loam, 10 to 15 percent slopes, severely eroded
RbE3	Rabun clay loam, 15 to 25 percent slopes, severely eroded
Roc	Rock land
Sta	Starr fine sandy loam
TbE	Tallapoosa cobbly fine sandy loam, 6 to 25 percent slopes
TcE	Tallapoosa fine sandy loam, 10 to 25 percent slopes
TdG	Tallapoosa soils, 25 to 70 percent slopes
TlC	Tusquitee loam, 6 to 10 percent slopes
TlD	Tusquitee loam, 10 to 25 percent slopes
TlF	Tusquitee loam, 25 to 60 percent slopes
TmE	Tusquitee stony loam, 10 to 25 percent slopes
TmF	Tusquitee stony loam, 25 to 60 percent slopes
Toc	Toccoa soils
Wed	Wehadkee soils
WgC	Wickham fine sandy loam, 6 to 10 percent slopes
WgD	Wickham fine sandy loam, 10 to 25 percent slopes
WgF	Wickham fine sandy loam, 25 to 50 percent slopes
WnD3	Wickham sandy clay loam, 10 to 15 percent slopes, severely eroded

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under

Tunnel

Buildings
- School
- Church

Mine and quarry

Gravel pit

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

Forest fire or lookout station

Sawmill

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
- Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions

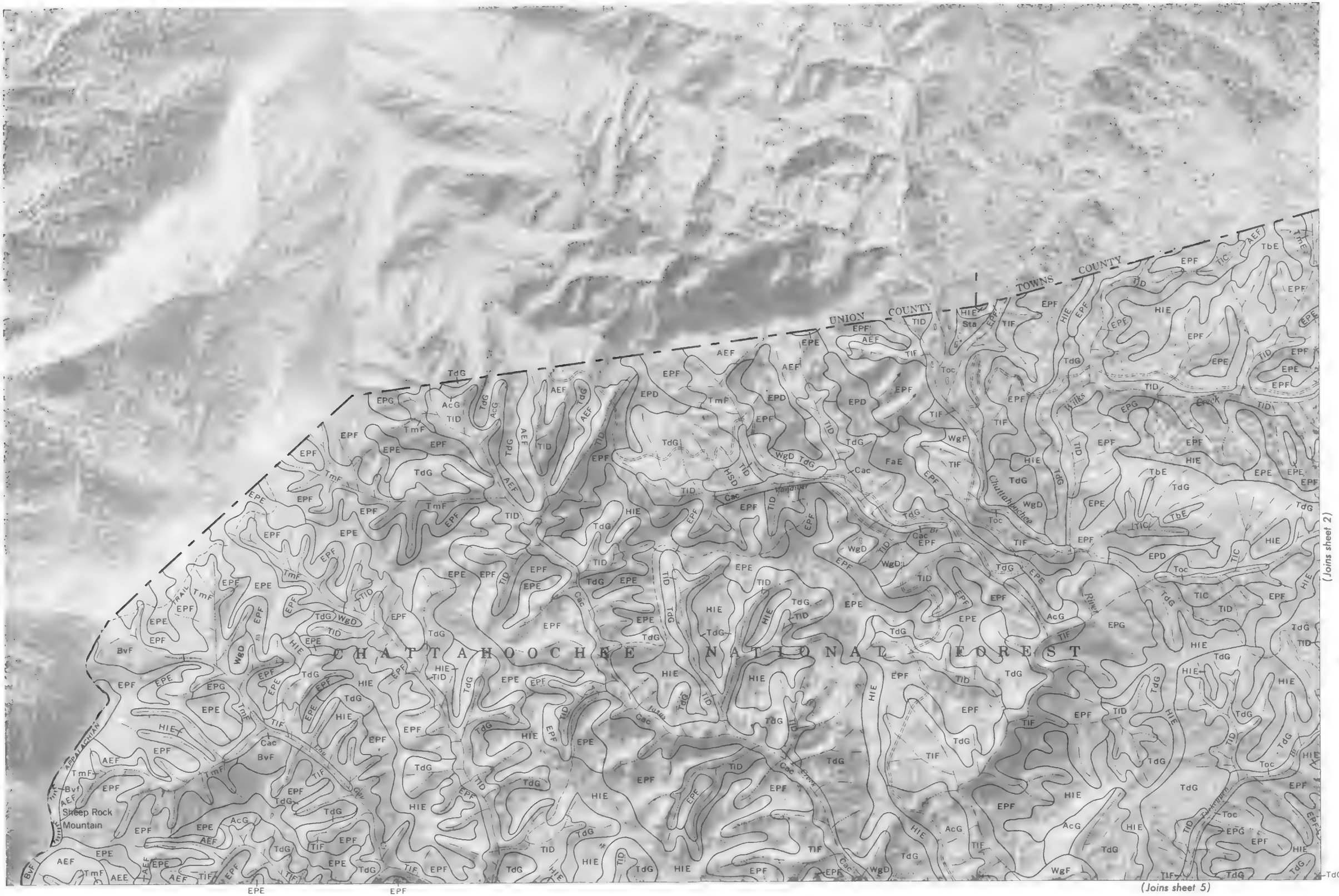
	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stoniness
  - Stony
  - Very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully
- Sandy area

Soil map constructed 1968 by Cartographic Division, Soil Conservation Service, USDA, from 1956, 1960 and 1963 aerial photographs. Controlled mosaic based on Georgia plane coordinate system, west zone, transverse Mercator projection, 1927 North American datum.

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 1



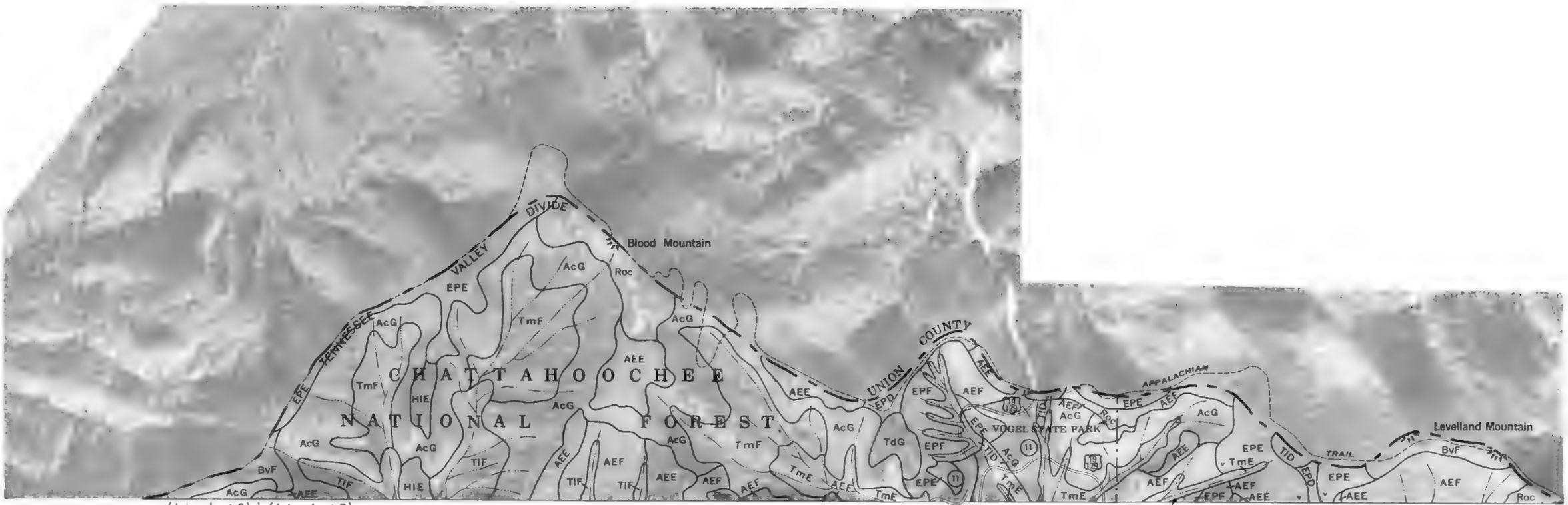
DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 2

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 3

4

N

1 Mile
5000 Feet
0
Scale 1:15840
1000
2000
3000
4000
5000



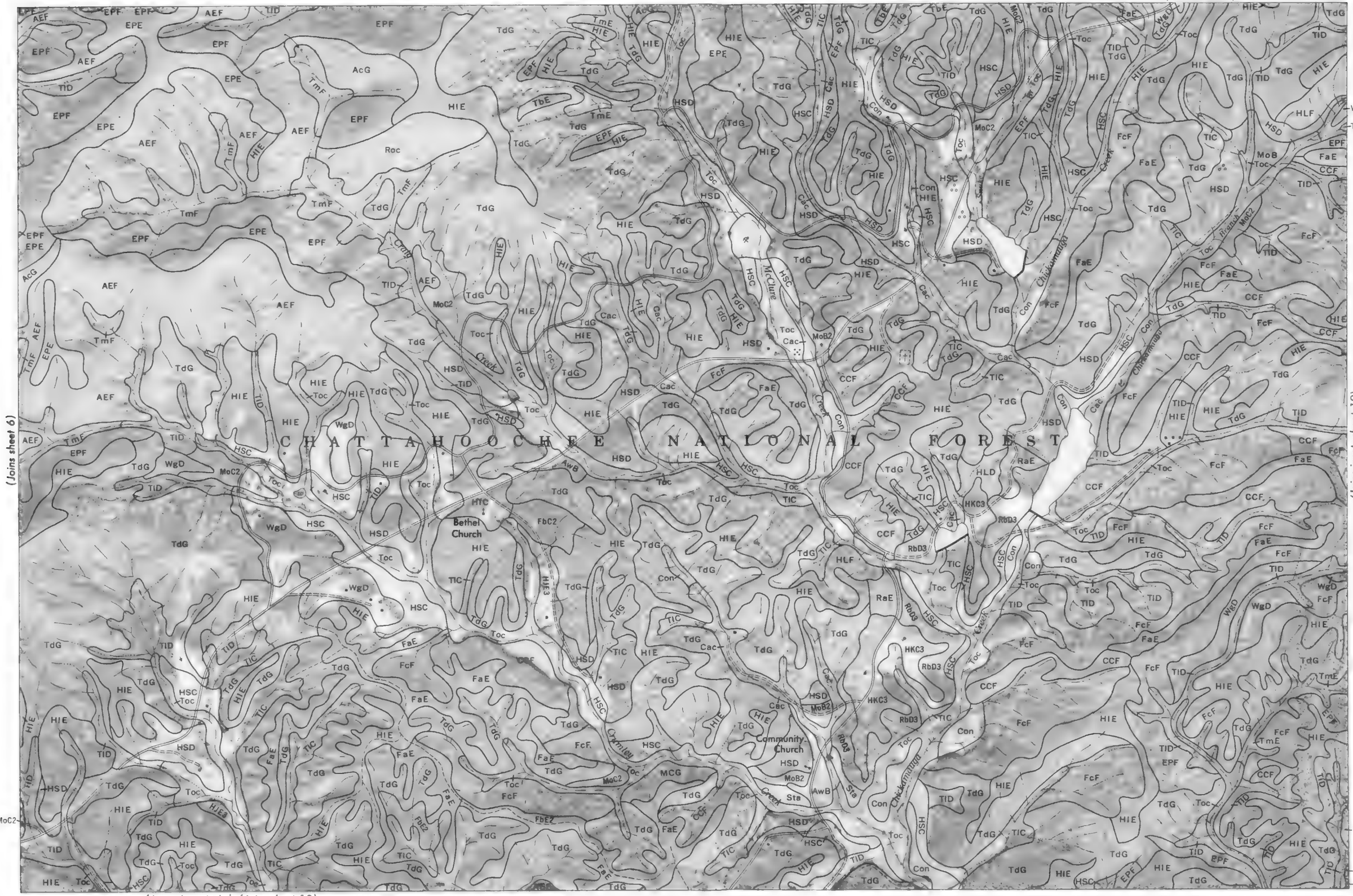
(Joins sheet 8) | (Joins sheet 9)


(Joins sheet 1)
(Joins sheet 10)
(Joins sheet 11)
(Joins sheet 6)
CHATTAHOOCHEE NATIONAL FOREST
UNION COUNTY
Blue Knob
Chattahoochee River
Jasus Creek
Cool Springs Branch
Double Gap Branch
Blue Knob Branch
Scale 1:15840
1 Mile
5000 Feet
N


6
N
(Joins sheet 2)
(Joins sheet 5)
(Joins sheet 7)
(Joins sheet 11) | (Joins sheet 12)
Scale 1:15840
1 Mile
5000 Feet
C H A T T A H O O C H E E   N A T I O N A L   F O R E S T
Chattahoochee
River
Smith Creek
Hickorynut
Ridge
Spoilcane
UNICOI STATE PARK
NATIONAL FOREST BDY

(Joins sheet 3)

(Joins sheet 6)



(Joins sheet 12)

(Joins sheet 13)

(Joins inset, sheet 19)

7

N

1 Mile

5000 Feet

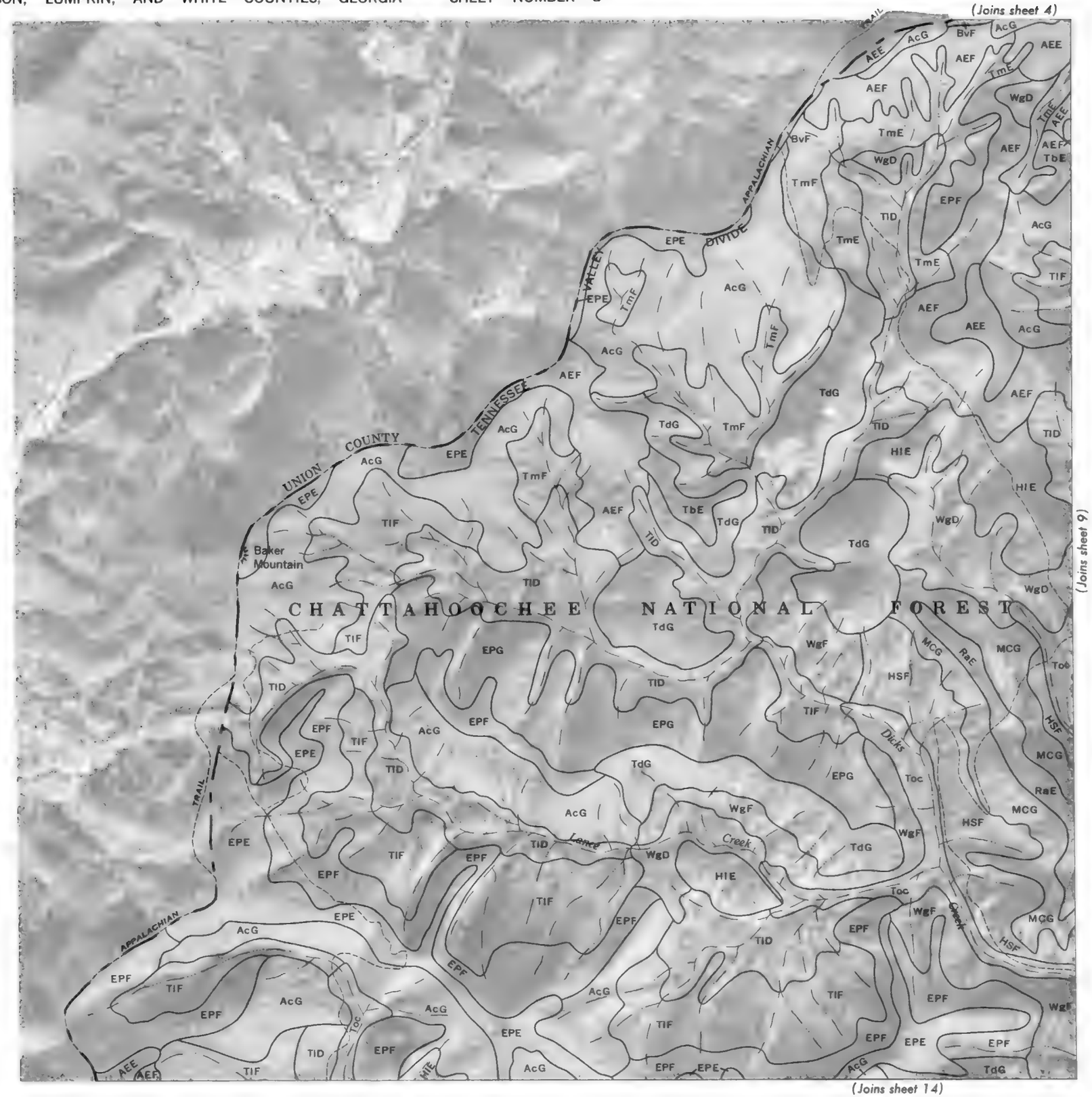
Scale 1:15840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 8

(Joins sheet 4)



(Joins sheet 9)

(Joins sheet 14)

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 9

(Joins sheet 4)

(Joins sheet 8)

(Joins sheet 15)

(Joins sheet 10)

9

N

1 Mile

5,000 Feet

Scale 1:15840

0 ¼ ½ ¾ 1

1000 2000 3000 4000 5000

(10)

N

1 Mile

5000 Feet

Scale 1:15840

0 ¼ ½ ¾ 1 1000 2000 3000 4000 5000

(Joins sheet 9)

(Joins sheet 5)

(Joins sheet 11)

(Joins sheet 16)

CHATTAHOOCHEE NATIONAL FOREST

APPALACHIAN TRAIL

UNION COUNTY

LUMPKIN COUNTY

WHITE COUNTY

Wildcat Mountain

Rocky Mountain

Toccoa Creek

Hugus Creek

Courtauld Creek

AcG AEE AEF BvF Cac EPD EPE EPF HIE HLF HSD MCG Roc TbE TdG TID TIF TmE TmF Toc WgD WgF

(Joins sheet 5) | (Joins sheet 6)

(Joins sheet 10)

(Joins sheet 12)

(Joins sheet 17)

CHATTAHOOCHEE NATIONAL FOREST

N

Scale 1:15840

1 Mile

5000 Feet


N
(Joins sheet 6)
(Joins sheet 7)
(Joins sheet 11)
(Joins sheet 13)
(Joins sheet 18)
CHATTAHOOCHEE NATIONAL FOREST
UNICOI STATE PARK
CHATTAHOOCHEE NATIONAL FOREST
Union Church
Chattahoochee Church
Robertstown
Helen
Smith Creek
Chattahoochee River
Church Creek
Hurricane Creek
Scale 1:15840
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000

(Joins sheet 7) | (Joins inset, sheet 19)

(Joins sheet 12)

(Joins sheet 19)

13

N

1 Mile

5000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

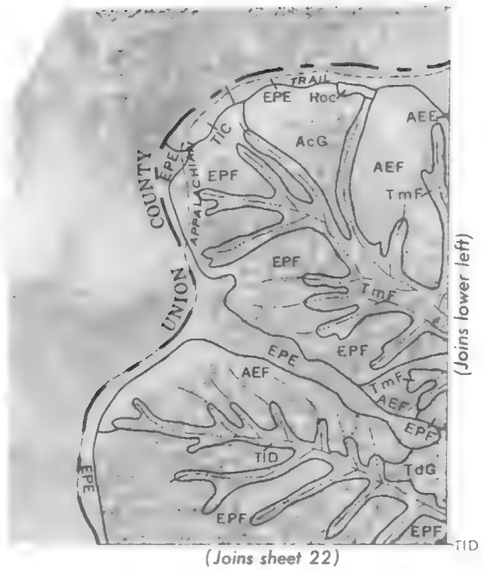
N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 8)



(Joins lower left)

(Joins sheet 22)

(Joins upper right)

(Joins sheet 23)

(Joins sheet 15)

C H A T T A H O O C H E E N A T I O N A L F O R E S T

UNION COUNTY

LOOKOUT TOWER

APPALACHIAN TRAIL

Miller Creek

Pigeon Mtn.

Dockery Lake

Waters Creek

Cottonwood Creek


15
N
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 24)
CHATTAHOOCHEE NATIONAL FOREST
Chestatee River
Dicks Creek
Waters Creek
Miller Cr.
Frogtown Creek
Corinth Church
Turners Corner
Mt Pisgah Ch & Sch
1 Mile
5000 Feet
Scale 1:15840

N

1 Mile

5,000 Feet

Scale 1:15840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 10)

(Joins sheet 15)

(Joins sheet 17)

(Joins sheet 25)

Little Buzzard Mountain

Buzzard Mountain

Piney Mountain

Pinnacle Mountain

Corinth Church

CHATTAHOOCHEE NATIONAL FOREST

COUNTY LUMPKIN COUNTY WHITE

Creek

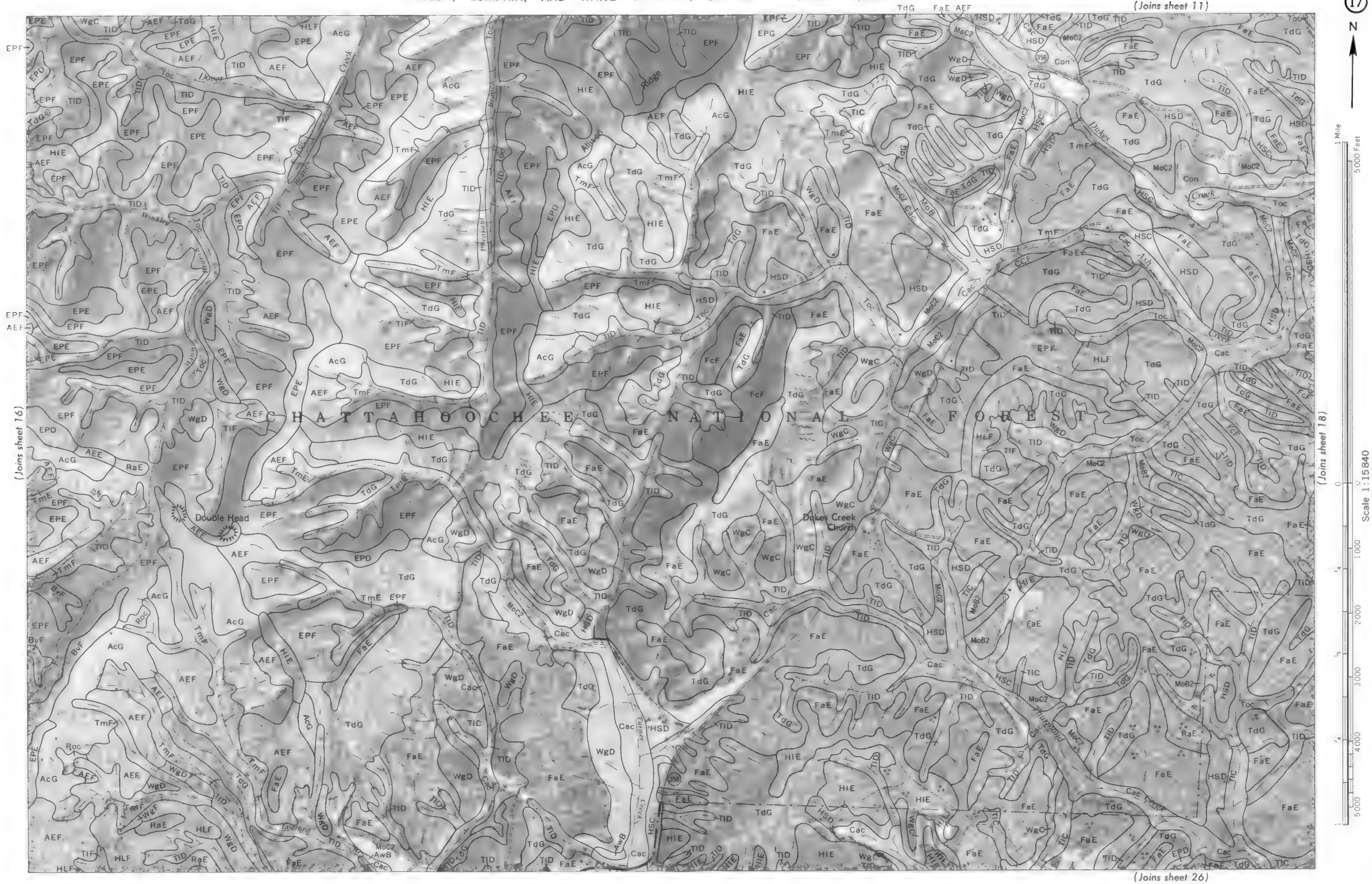
Town

Creek

GRAVEL PIT

11

129


17
N
(Joins sheet 11)
(Joins sheet 16)
(Joins sheet 18)
(Joins sheet 26)
CHATTAHOOCHEE NATIONAL FOREST
Double Head
Dukes Creek Church
Ridge
Allison
Dukes
Creek
Ash
Creek
Winkler
Turner
Creek
Ledford
356
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
Scale 1:15840

(18)

N

1 Mile

5000 Feet

Scale 1:15840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 12)

(Joins sheet 17)

(Joins sheet 19)

(Joins sheet 27)

CHATTAHOOCHEE NATIONAL FOREST

Nacoochee

Crescent Hill Church

Indian Mound

Nacoochee Valley

Union Grove Chapel

Dukes Creek

CHATTAHOOCHEE RIVER

(75)

(Joins sheet 13)

(Joins sheet 18)

(Joins sheet 28)

(3)

(Joins sheet 7)

(Joins sheet 13)

19

N

1 Mile

5000 Feet

0

Scale 1:15840

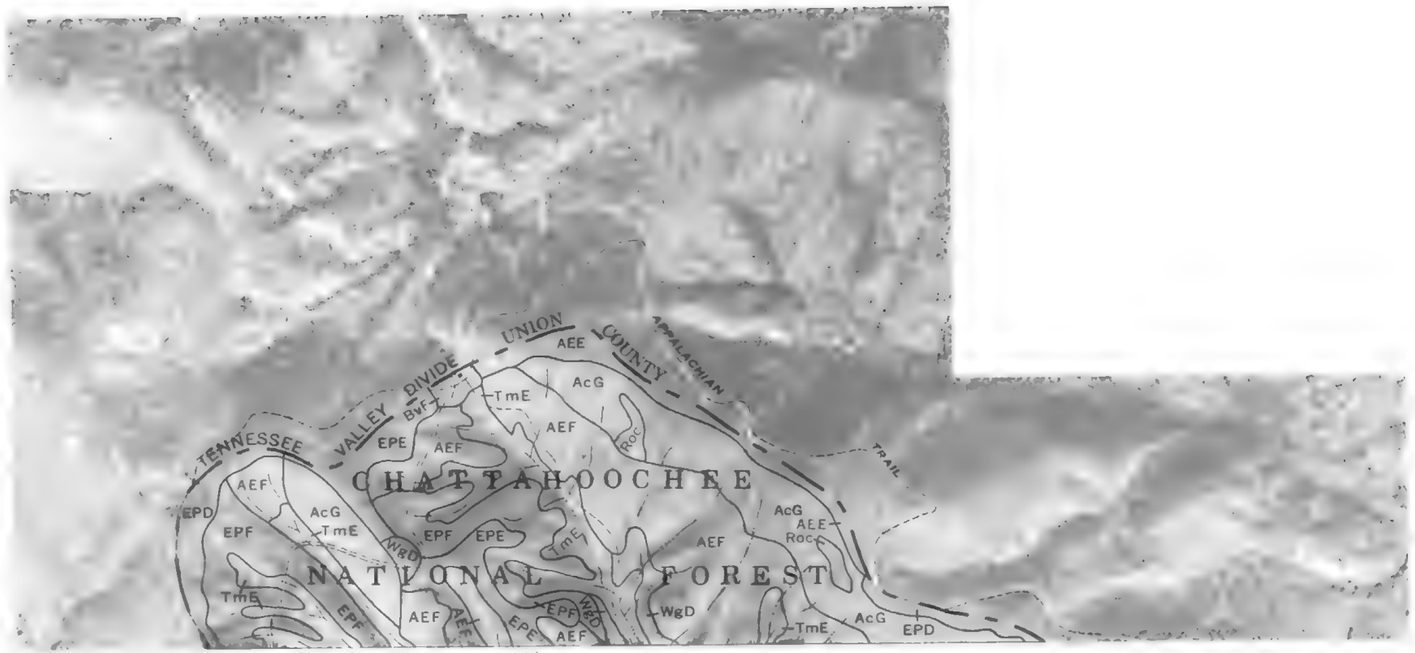
20

N

1 Mile

5000 Feet

Scale 1:15840



(Joins sheet 21)

(Joins sheet 21)

(Joins sheet 30)

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 21

(Joins inset, sheet 20)

21

N

TENNESSEE - VALLEY DIVIDE

UNION COUNTY

UNION COUNTY

Sassafras Mtn.

APPALACHIAN TRAIL

CHATTAHOOCHEE NATIONAL FOREST

RANGER

CAMP

Landing

Strip

Creek

Montgomery

West Fork

Ward Creek

Con

Toc

Cac

Sta

TIC

HIC

HLD

HLF

HSC

HSD

HIE

HJE3

TmE

TmF

TdG

TbE

WgD

WgC

AcG

AEF

EPF

EPE

EPD

TID

BvF

RaE

RbD3

Scale 1:15840

1 Mile

5,000 Feet

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 31)


(Joins inset, sheet 14)
N
1 Mile
5000 Feet
Scale 1:15840
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 32)
UNION COUNTY
TENNESSEE VALLEY DIVIDE
APPALACHIAN TRAIL
Long Mountain
CHATTAHOOCHEE NATIONAL FOREST
Hidden Lake
Two Run Creek
Cane Creek
Walden Creek
Dicks Creek

(Joins sheet 14)

(Joins sheet 22)

(Joins sheet 24)

(Joins sheet 33)

CHATTAHOOCHEE NATIONAL FOREST

Fort Smith

23

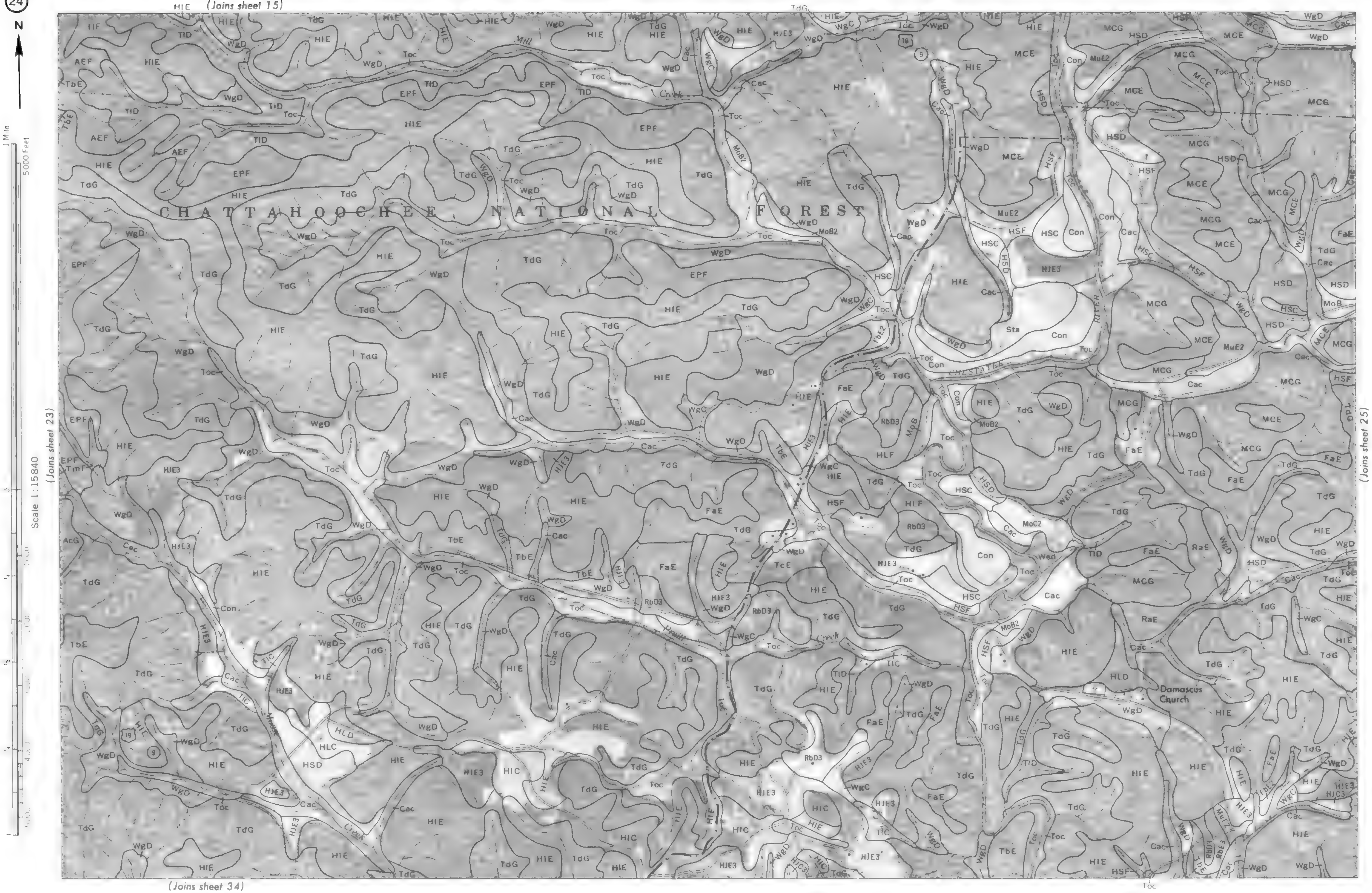
N

1 Mile

5000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000


N
(Joins sheet 15)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 34)
1 Mile
5000 Feet
Scale 1:15840
CHATTAHOOCHEE NATIONAL FOREST
Mill Creek
CHESTATEE RIVER
Creek
Damascus Church

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 25

25

N

(Joins sheet 16)

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 35)

CHATTAHOOCHEE NATIONAL FOREST

DAWSON COUNTY

LUMPKIN COUNTY

WHITE COUNTY

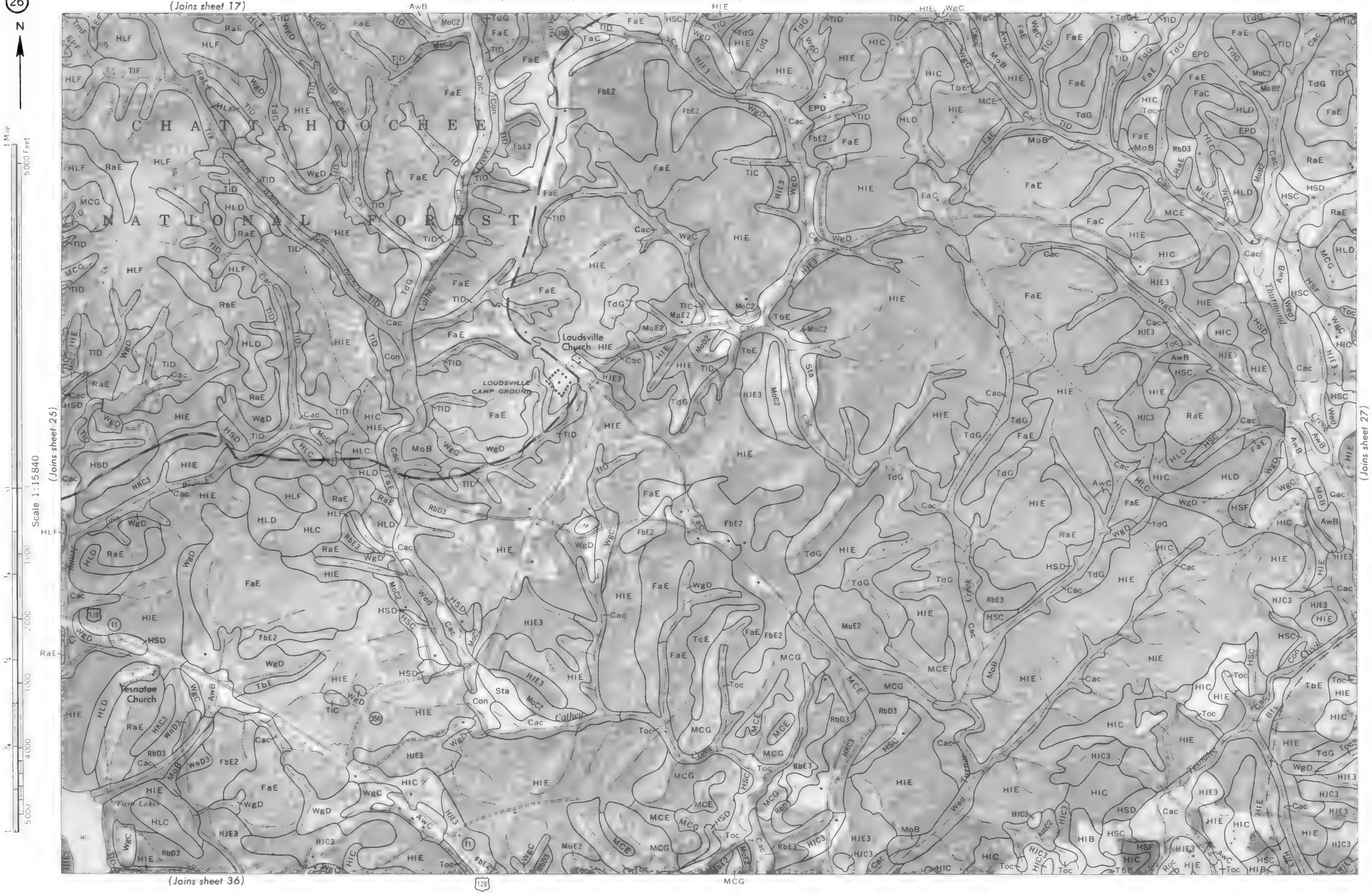
Mt Pleasant Church

Twin Lakes

1 Mile

5000 Feet

Scale 1:15840


26
N
(Joins sheet 17)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 36)
Scale 1:15840
1 Mile
5000 Feet
C H A T T A H O O C H E E
N A T I O N A L F O R E S T
Loudsville Church
LOUDSVILLE CAMP GROUND
Yesnatee Church
Twin Lakes
Cathey Creek
Thurmond
Yesnatee
Con Creek

(Joins sheet 18)

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 37)

27

N

1 Mile

5,000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 19)

(Joins sheet 27)

(Joins sheet 38)

Brasstown Creek

Con Creek

CHATTAHOOCHEE RIVER

HABERSHAM COUNTY

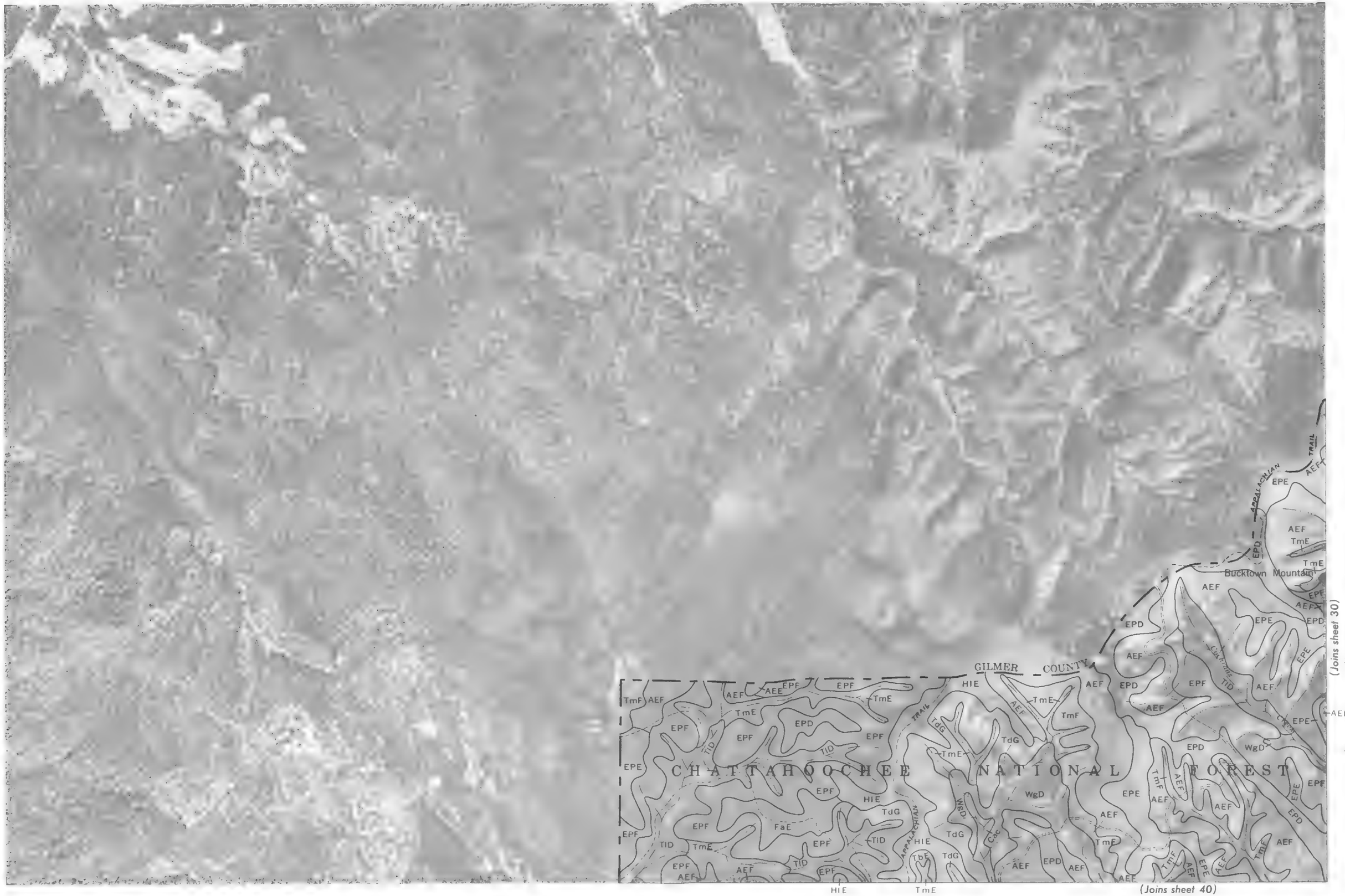
Sta

Wed

Con

Bfs

255



29
N

1 Mile
5000 Feet
Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 20)

(Joins sheet 29)

(Joins sheet 31)

(Joins sheet 41)

CHATTAHOOCHEE NATIONAL FOREST

GILMER COUNTY

APPALACHIAN TRAIL

FANNIN COUNTY

LUMPKIN COUNTY

DAWSON COUNTY

Cochrum Cr.

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 31

N

1 Mile

5000 Feet

Scale 1:15840

1 0 1000 2000 3000 4000 5000

CHATTAHOOCHEE NATIONAL FOREST

Pleasant Hill Church

Cane Creek Church

Mountain

Creek

Run

(Joins sheet 22)

(Joins sheet 31)

(Joins sheet 33)

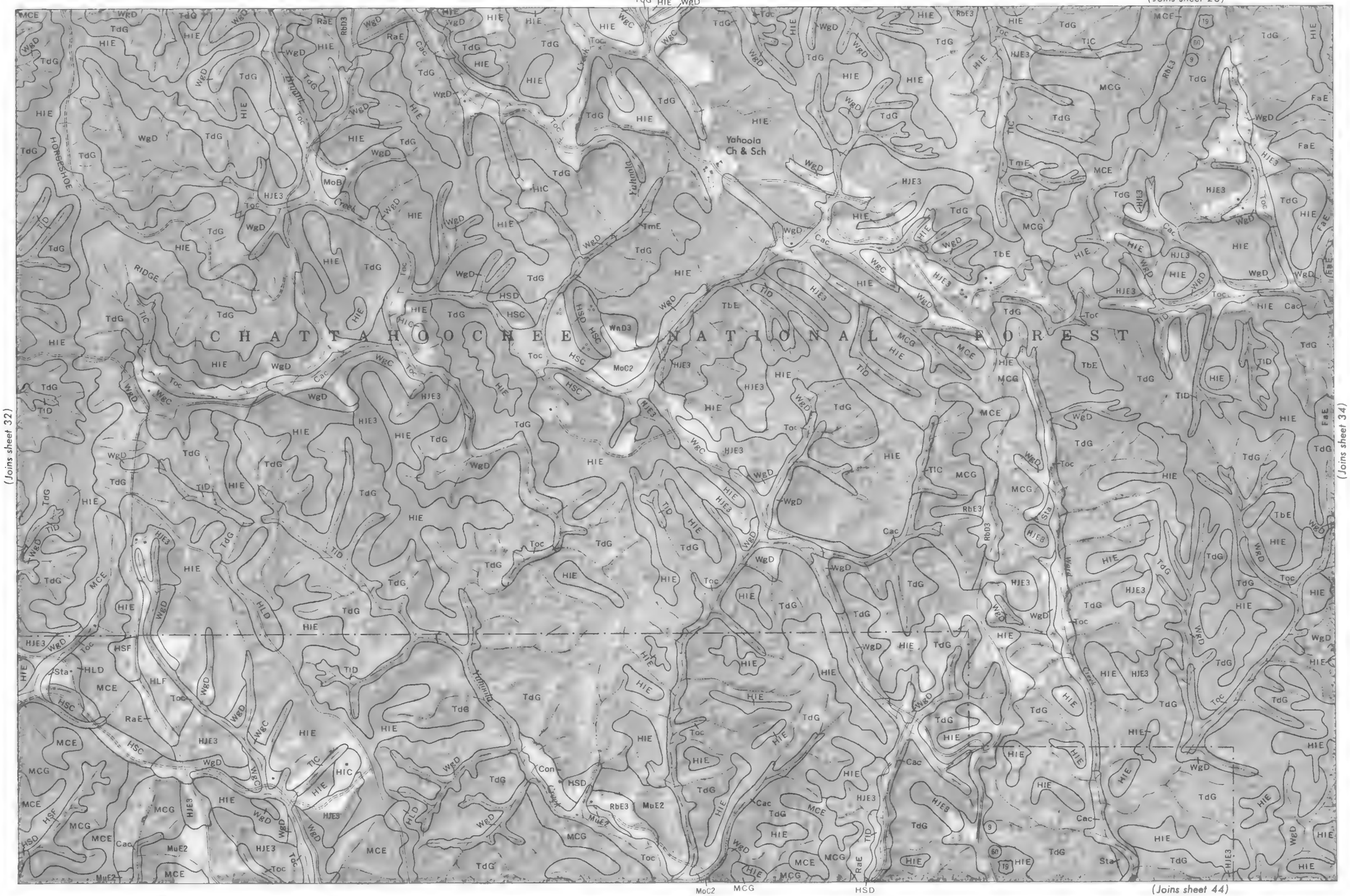
(Joins sheet 43)

(Joins sheet 23)

(Joins sheet 32)

(Joins sheet 34)

(Joins sheet 44)



N

1 Mile

5000 Feet

Scale 1:15840

N

Scale 1 15840

(Joins sheet 24)

(Joins sheet 33)

(Joins sheet 35)

(Joins sheet 45)

CHATTAHOOCHEE NATIONAL FOREST

Macedonia Church

Three Sisters Mountain

HIE Creek

Tate Creek

(Joins sheet 25)

(Joins sheet 34)

(Joins sheet 36)

(Joins sheet 46)

35

N

1 Mile

5000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

LUMPKIN COUNTY / WHITE COUNTY

Town Creek Church

Lake Arthur

Glade Branch

Twin Creek

Jenny Creek

Twin Lakes

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 26)

(Joins sheet 35)

(Joins sheet 37)

(Joins sheet 47)

INDUSTRIAL SITE

White County School

CLEVELAND

Mt View Church

(Joins sheet 27)

(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 48)

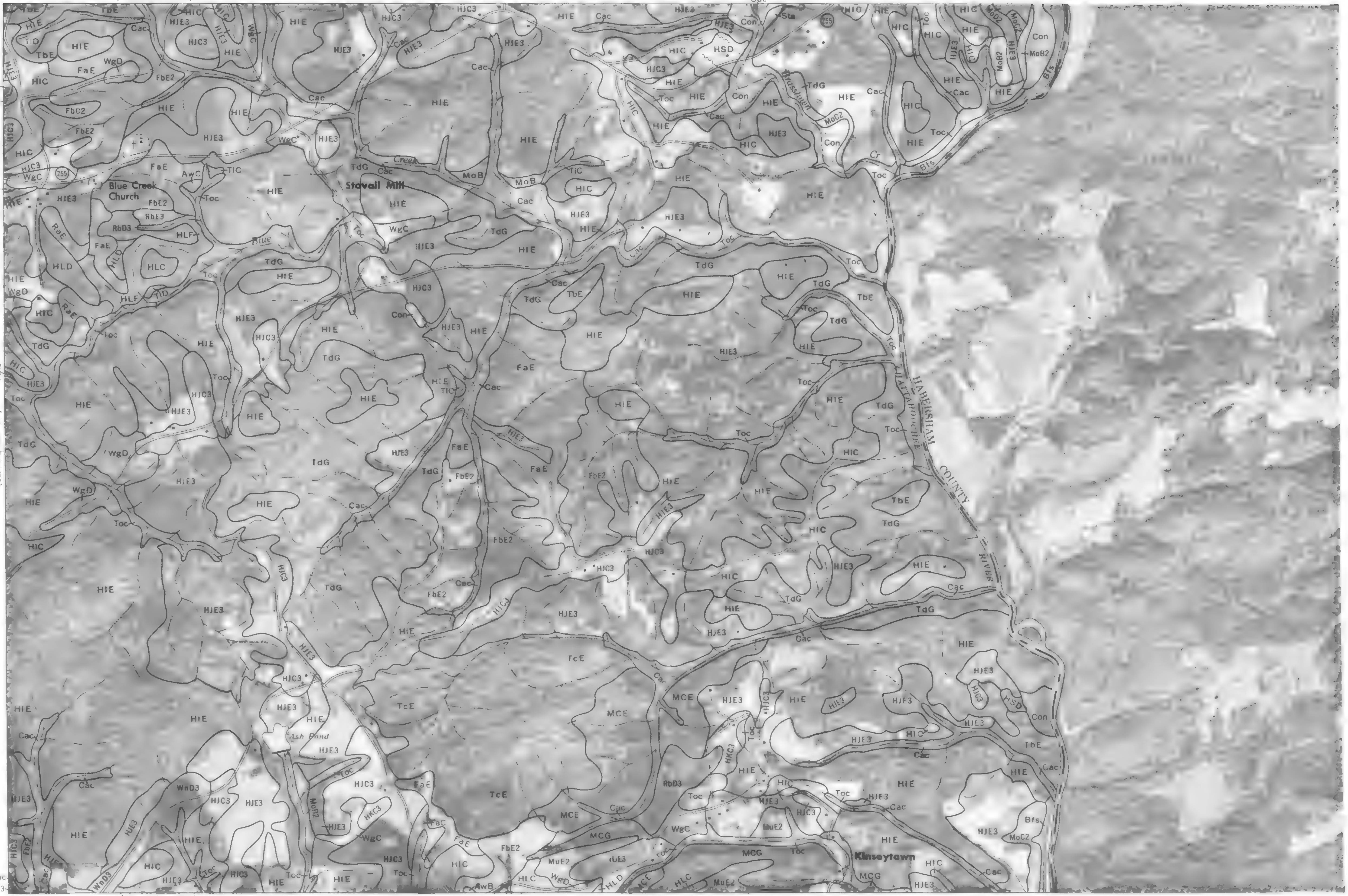
N

(Joins sheet 28)

(Joins sheet 37)

Scale 1:15840

1 Mile
5000 Feet
0
1000
2000
3000
4000
5000



(Joins sheet 49)

N

1 Mile

5000 Feet

Scale 1:15840

GILMER COUNTY

PICKENS COUNTY

APPALACHIAN TRAIL

CHATTAHOOCHEE NATIONAL FOREST

Amicalola GRAVEL PIT

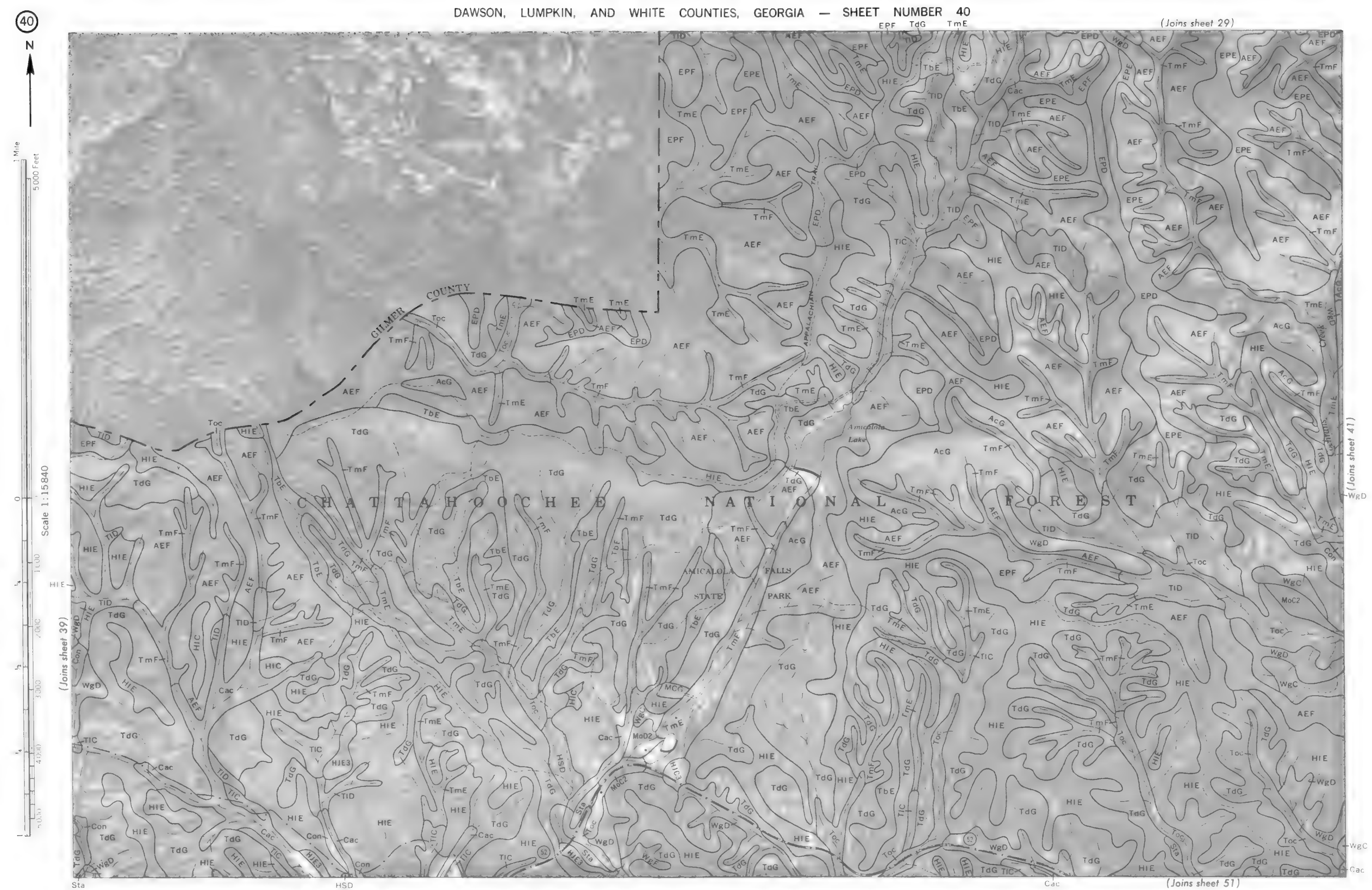
Con Creek

Antioch Church

(Joins sheet 40)

(Joins sheet 50)

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 40



(41)

N

(Joins sheet 30)

(Joins sheet 40)

(Joins sheet 42)

(Joins sheet 52)

CHATTAHOOCHEE NATIONAL FOREST

LUMPKIN COUNTY
DAWSON COUNTY

Nimblewill Creek

1 Mile
5000 Feet
Scale 1:15840

(42)

N

1 Mile
5000 Feet

Scale 1:15840
0 ¼ ½ ¾ 1 5000 4000 3000 2000 1000

(Joins sheet 31)

(Joins sheet 41)

(Joins sheet 43)

(Joins sheet 53)

CHATTAHOOCHEE NATIONAL FOREST

Nimblewill Church

Nimblewill Creek

Jones Creek

Toc Creek

RIVER

TdG HIE EPF HIC HID HJE3 HJC3 HLD HSC HSD TmE TmF WgD WgC FaE FbE2 FbC2 FoC RbD3 MoD2 MoB2 MoC2 MCG MCE TIC TID EPG Con Cac Sta Wed Toc AEF

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 43

(43)

N

(Joins sheet 32)

(Joins sheet 42)

(Joins sheet 44)

(Joins sheet 54)

CHATTAHOOCHEE NATIONAL FOREST

Hightower Church

Oak Grove Church

Scale 1:15840

1 Mile

5000 Feet

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 33)

(Joins sheet 43)

(Joins sheet 45)

(Joins sheet 55)

Salem Church

Bethlehem Church

Camp Creek School

CAMP GLISSON

Concord Church

Bethel Church

Sta

TID

N

CHATTAHOOCHEE NATIONAL FOREST

Cavenders Creek Church

Phillipi Church

Scale 1:15840

1 Mile 5,000 Feet

(Joins sheet 34)

(Joins sheet 44)

(Joins sheet 46)

(Joins sheet 56)

N

1 Mile

5000 Feet

0

Scale 1:15840

1

5000

4000

3000

2000

1000

(Joins sheet 35)

(Joins sheet 45)

(Joins sheet 47)

(Joins sheet 57)

(Joins sheet 36)

(Joins sheet 46)

(Joins sheet 48)

(Joins sheet 58)

47

N

1 Mile

5000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

N

1 Mile

5 000 Feet

Scale 1:15840

(Joins sheet 37)

(Joins sheet 47)

(Joins sheet 49)

(Joins sheet 59)

Seabolt Pond

Dorsey Pond

Mossy Creek Church

County Landing Field

Wilford Pond

Mossy Creek

Con Creek

White Creek

(Joins sheet 38)

(Joins sheet 48)

(Joins sheet 60)

(Joins inset, sheet 70)

N

1 Mile

5000 Feet

Scale 1:15840

Leaf

Chattahoochee Church

White Creek School

Macedonia Church

Union Grove Church

New Bridge Church

HARALSHAM COUNTY

CHATTAHOOCHEE

RIVER

Creek

White

(Joins sheet 39)

(Joins sheet 51)

(Joins sheet 61)

50

N

1 Mile

5,000 Feet

Scale 1:15840

(Joins sheet 40)

(Joins sheet 50)

(Joins sheet 52)

(Joins sheet 62)

CHATTAHOOCHEE NATIONAL FOREST

Johntown

Champions Fish Pond

Amicalola Creek

51

N

Scale 1:15840

1 0 1 2 3 4 5 6 Miles

5,000 Feet

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 41)

(Joins sheet 51)

(Joins sheet 53)

(Joins sheet 63)

CHATTAHOOCHEE NATIONAL FOREST

DAM

BORROW AREA

Wesley Chapel

New Hope Church

Cochrans Creek

Dunagin Creek

LUMPKIN COUNTY

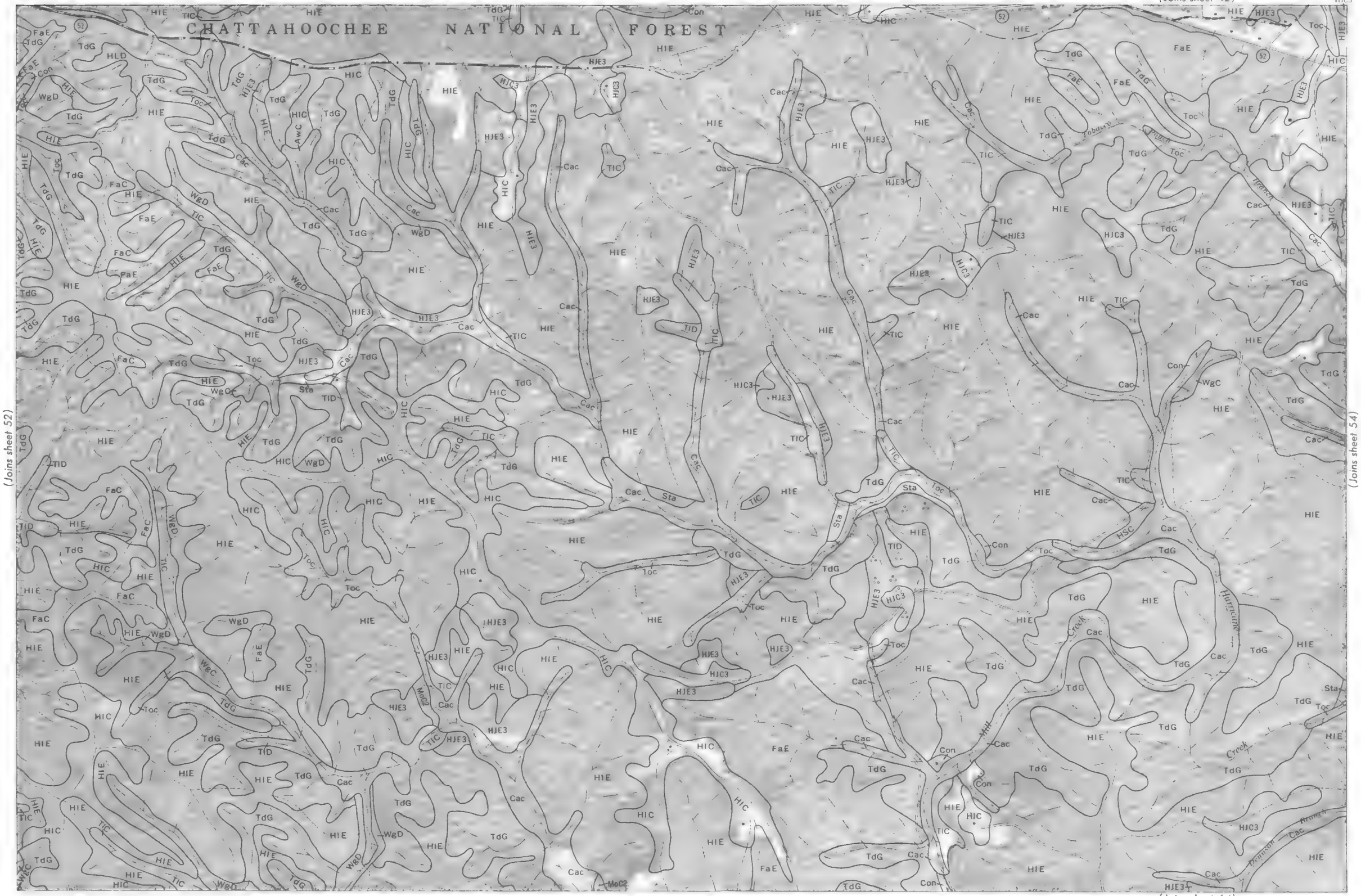
DAWSON COUNTY

(Joins sheet 42)

(Joins sheet 52)

(Joins sheet 54)

(Joins sheet 64)



(Joins sheet 43)

N

1 Mile

5000 Feet

Scale 1:15840

0 0 1000 2000 3000 4000 5000

(Joins sheet 53)

(Joins sheet 55)

(Joins sheet 65)

Silome Church

Pleasant Grove Church

Buckhorn Tavern

Tobacco Branch

Hurricane Creek

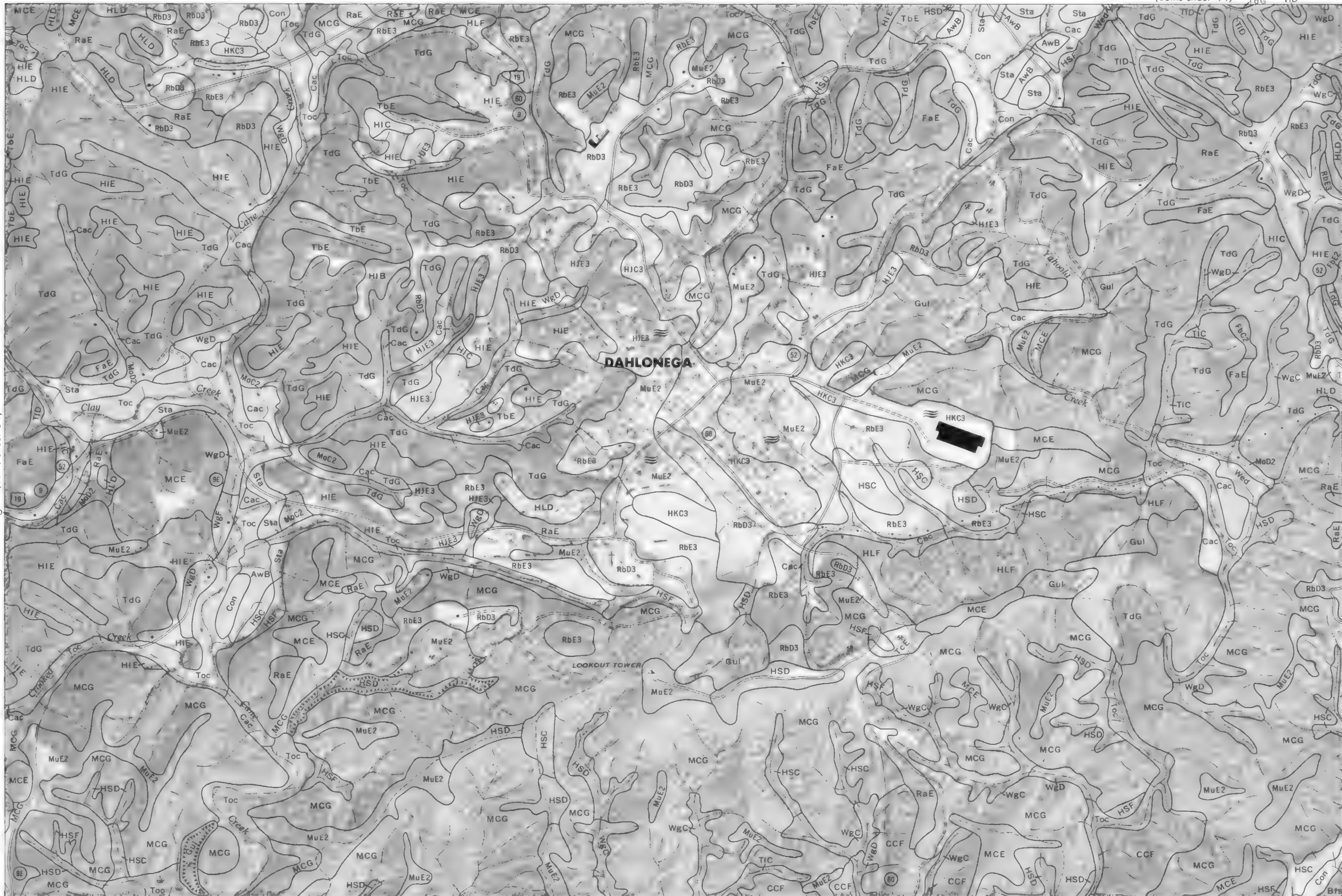
Lake Marie

Crooked Creek

Clay Branch

55

(Joins sheet 44)



(Joins sheet 54)

(Joins sheet 56)

(Joins sheet 66)

N

1 Mile

5000 Feet

0 1000 2000 3000 4000 5000

Scale 1:15840

N

Scale 1:15840

1 Mile 5000 Feet 0

(Joins sheet 45)

(Joins sheet 55)

(Joins sheet 57)

(Joins sheet 67)

Mt Sinai Church

Garland

Pecks Chapel

Mt Gilead Church

Cavenders Creek

Pecks Mill

CHESTATEE

(Joins sheet 46)

(Joins sheet 56)

(Joins sheet 58)

(Joins sheet 68)

58

N

1 Mile

5000 Feet

Scale 1:15840

0 1/4 1/2 3/4 1 0 300 2000 3000 4000 5000

(Joins sheet 47)

(Joins sheet 57)

(Joins sheet 59)

(Joins sheet 69)

Shoal Creek Ch

Shoal Creek School

Friendship Church

Shoal Creek

Jones Creek

HALL COUNTY

(Joins sheet 48)

(Joins sheet 58)

(Joins sheet 60)

(Joins inset, sheet 69)

59

N

1 Mile

5,000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

N

Scale 1:15840

1 Mile

5000 Feet

(Joins sheet 49)

(Joins sheet 59)

(Joins sheet 70)

(Joins inset, sheet 70)

Mossy Creek

White Creek Church

Webster Lake

White Creek

HABERSHAM COUNTY

CHATTAHOOCHEE RIVER

(Joins sheet 50)

(Joins sheet 62)

(Joins sheet 71)

N

1 Mile

5000 Feet

Scale 1:15840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

PICKENS COUNTY

Kelly Creek

Con Cac Roc TdG TmE TmF TIC TID HIE AEF EPD EPE BvF WgD WgF HLD

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 51)

(Joins sheet 61)

(Joins sheet 63)

(Joins sheet 72)

Pleasant Union Church

Amicalola Creek

Little Amicalola Creek

(Joins sheet 52)

(Joins sheet 62)

(Joins sheet 64)

(Joins sheet 73)

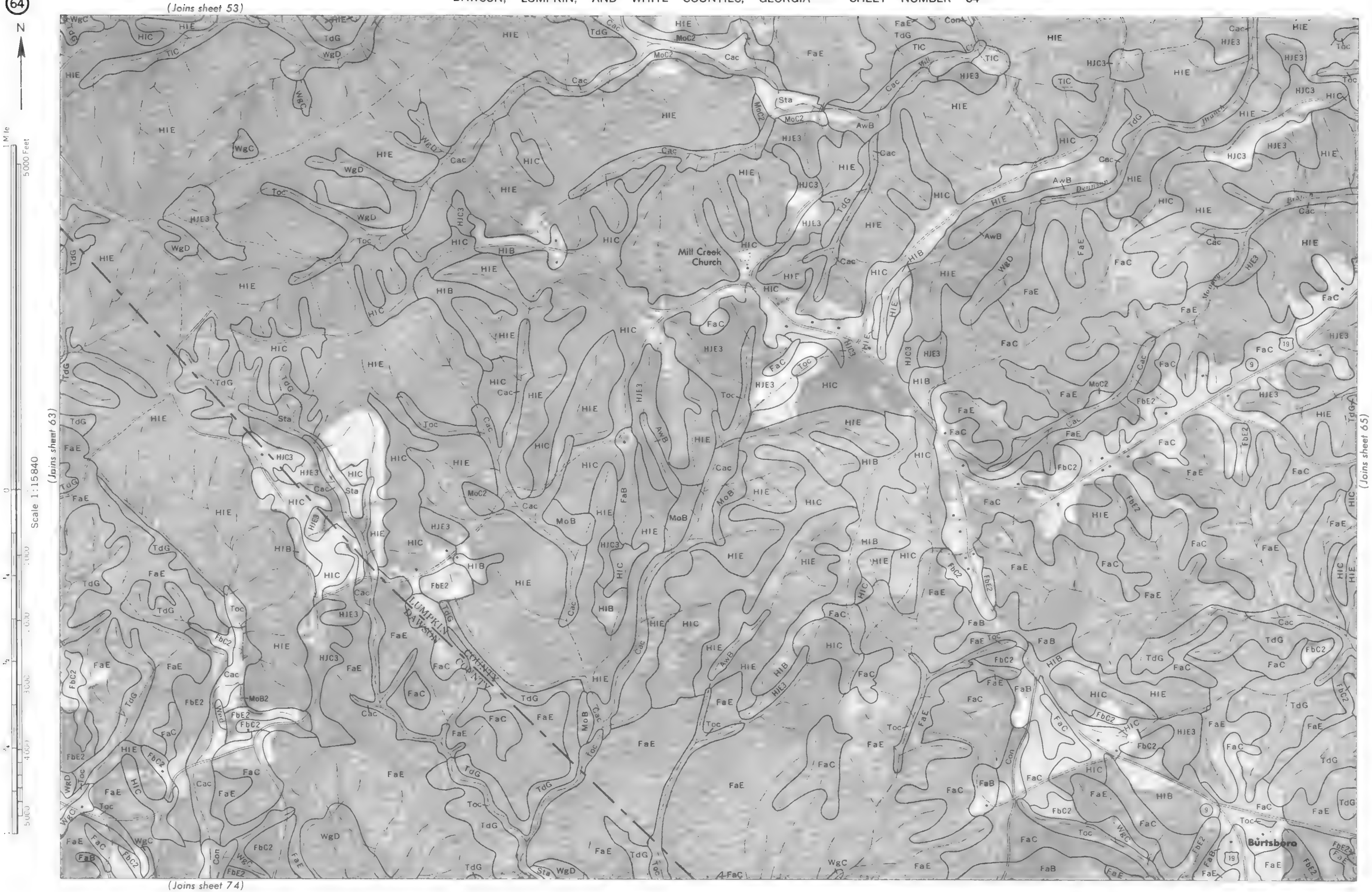
63

N

Scale 1:15840

1 Mile

5000 Feet


(Joins sheet 53)
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 74)
N
1 Mile
5000 Feet
Scale 1:15840
Mill Creek Church
LUMPKIN COUNTY
DAWSON COUNTY
Burtsboro

(Joins sheet 54)

(Joins sheet 64)

(Joins sheet 66)

(Joins sheet 75)

65

N

1 Mile

5000 Feet

Scale 1:15840

Aurora Church

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 55)

(Joins sheet 65)

(Joins sheet 67)

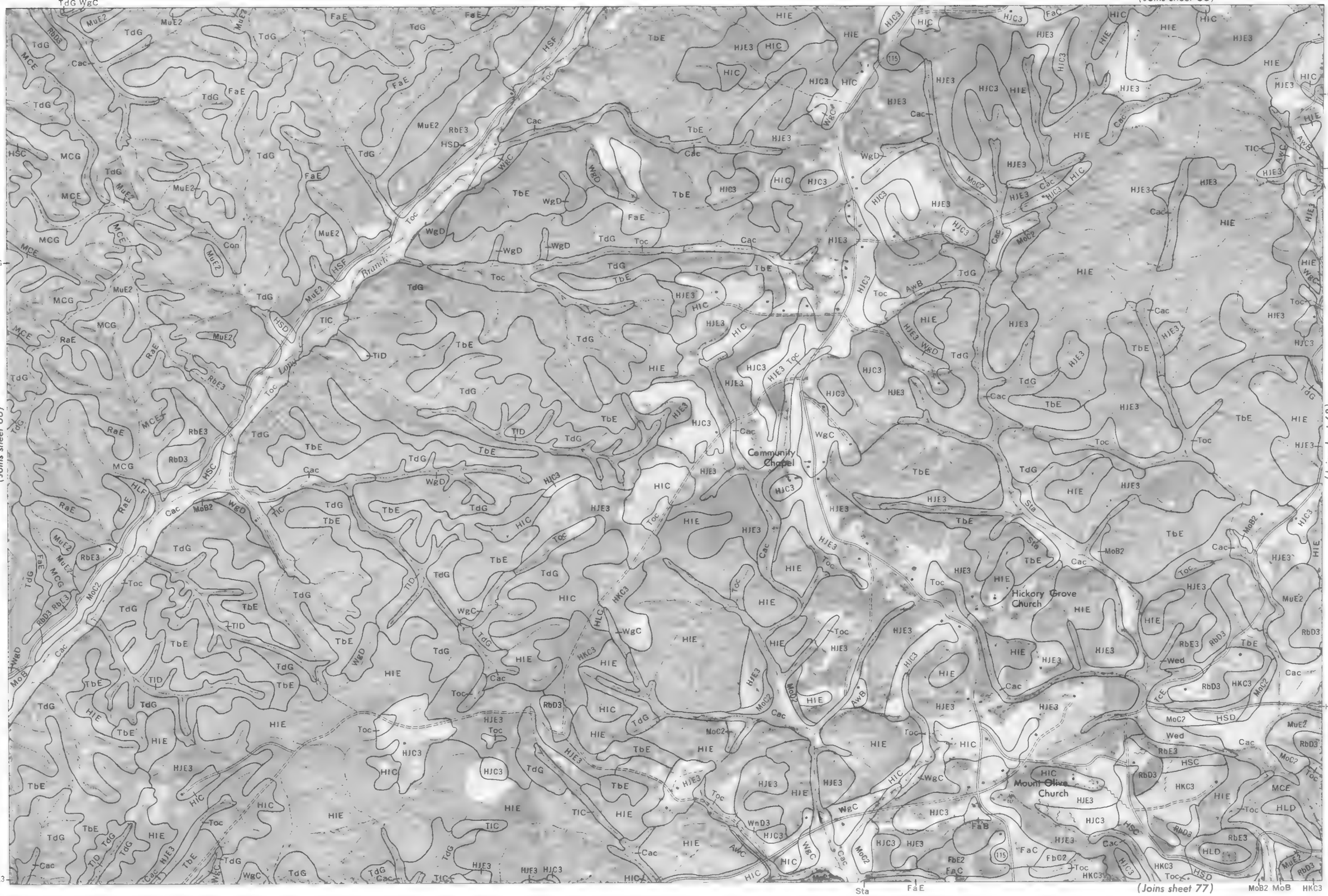
(Joins sheet 76)

(Joins sheet 56)

(Joins sheet 66)

(Joins sheet 68)

(Joins sheet 77)



N

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile

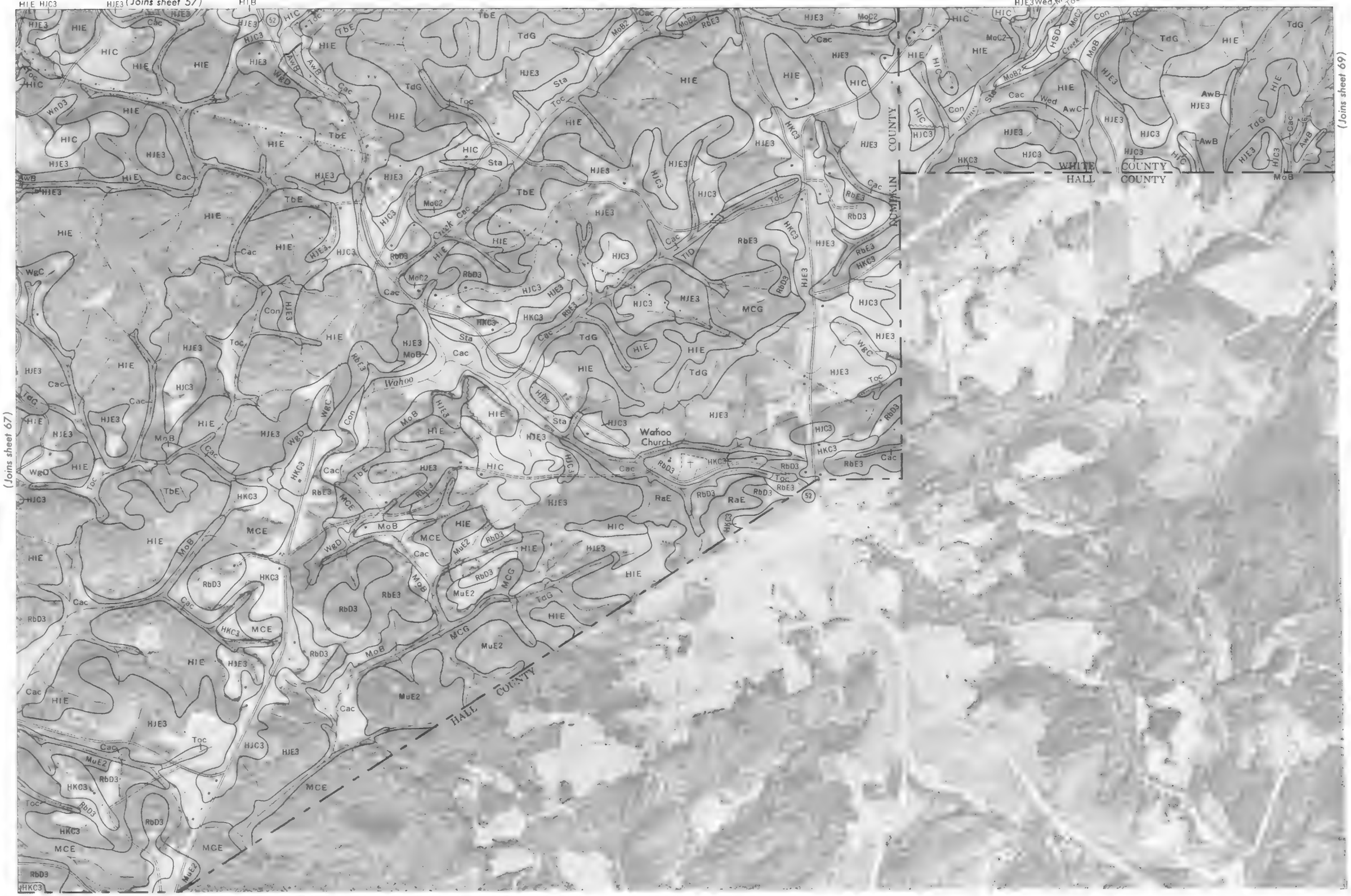
5000 Feet

Scale 1:15840

(Joins sheet 67)

(Joins sheet 57)

(Joins sheet 69)



(Joins sheet 68)

(Joins sheet 58)

(Joins lower left)

(Joins sheet 59)

(Joins upper right)

(Joins sheet 70)

HALL COUNTY

HALL COUNTY

HALL COUNTY

County Line Church

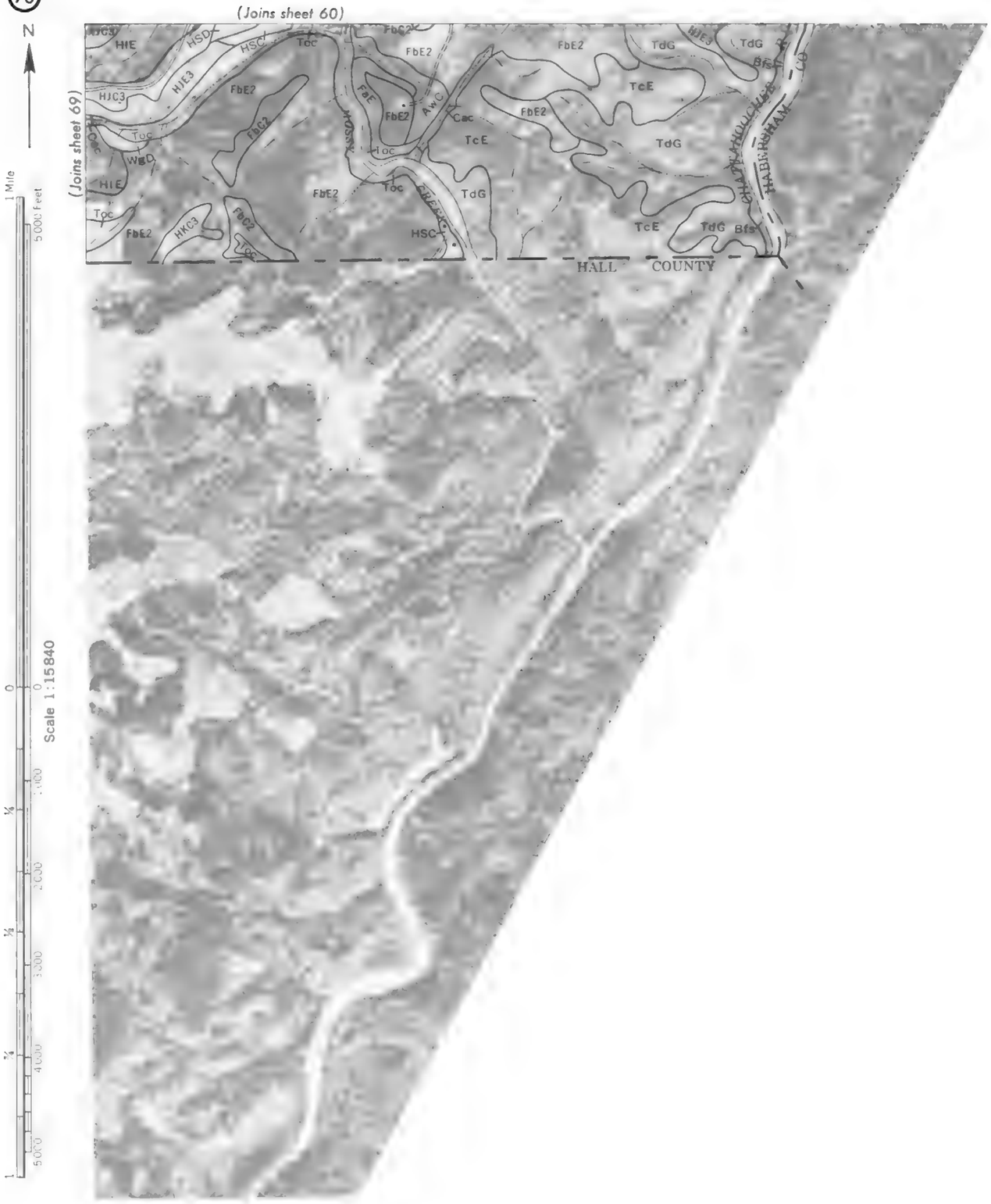
69

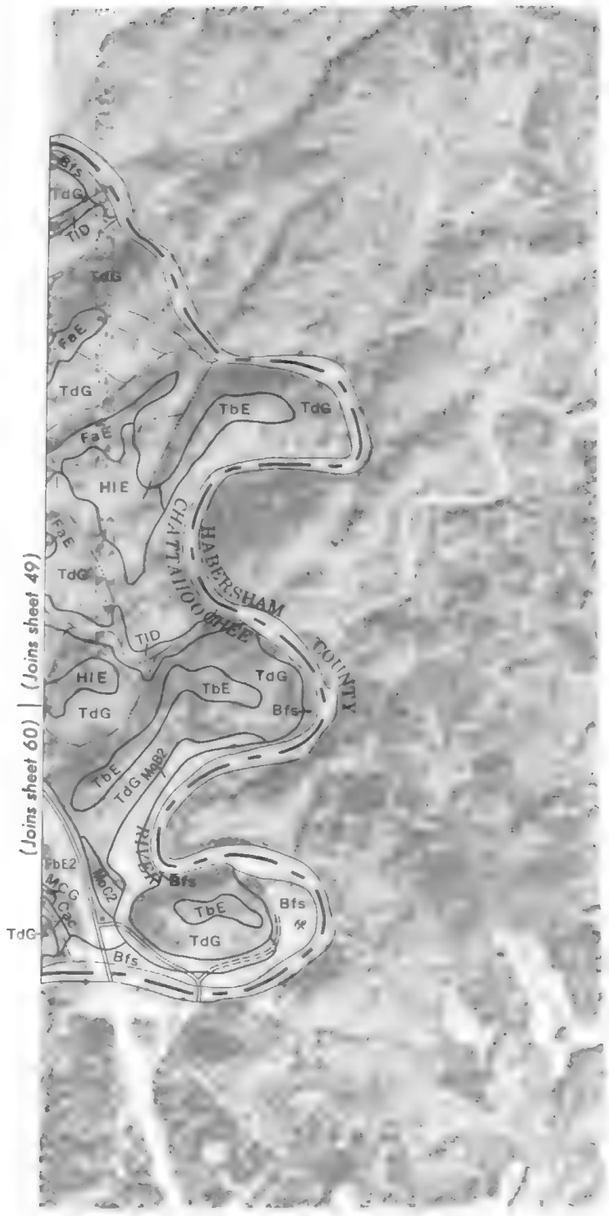
N

1 Mile

5000 Feet

Scale 1:15840


(Joins sheet 60)
(Joins sheet 69)
HIE
HSD
HSC
Toc
FbE2
HJE3
HJC3
FbC2
WaD
HKC3
FaE
AwC
Cac
TcE
TdG
Bfs
HALL
COUNTY
CHATTAHOOCHEE
HABERSHAM
N
1 Mile
5000 Feet
Scale 1:15840


(Joins sheet 49)
(Joins sheet 60)
Bfs
TdG
TID
FaE
TbE
HIE
McG2
McG
Cac
RUTLEDGE
CHATTAHOOCHEE
HABERSHAM
COUNTY

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 71

71

N

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 71)

(Joins sheet 62)

(Joins sheet 73)

(Joins sheet 78)

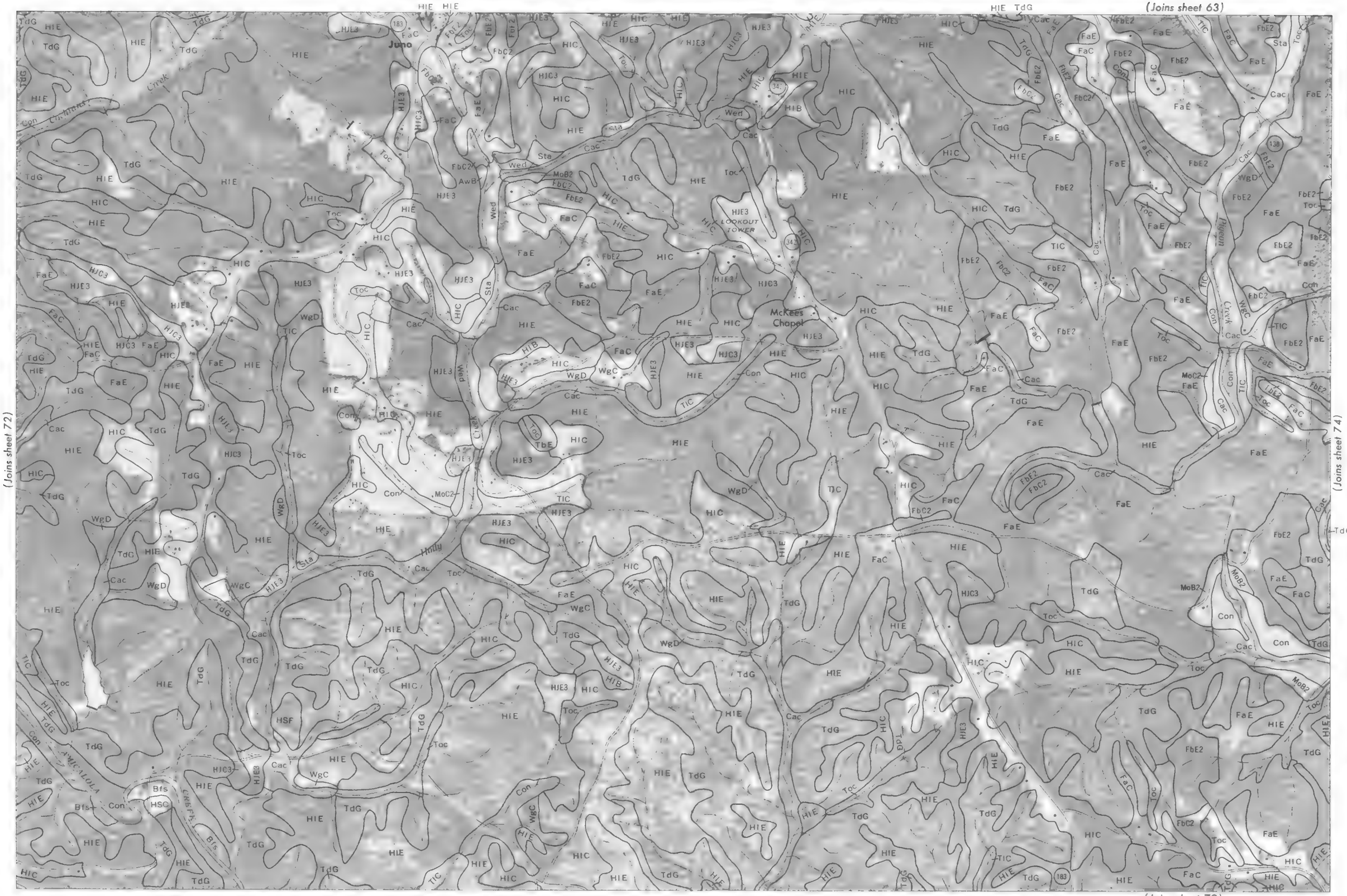
PICKENS COUNTY

(Joins sheet 63)

(Joins sheet 72)

(Joins sheet 74)

(Joins sheet 79)



N

Scale 1:15840

1 Mile

5000 Feet

N

1 Mile

5,000 Feet

Scale 1:15840

0 1000 2000 3000 4000 5000

(Joins sheet 64)

(Joins sheet 73)

(Joins sheet 75)

(Joins sheet 80)

McKee

Bethel Church

Pigeon Creek

Shoal Creek

Hurt Creek

DAWSON COUNTY

LUMPKIN COUNTY

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 75

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 66)

(Joins sheet 75)

(Joins sheet 77)

(Joins sheet 82)

Soules Chapel

Long Branch

Chestatee River

(Joins sheet 67)

(Joins sheet 76)

HALL COUNTY

St Paul Church

77

N

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile
5000 Feet

Scale 1:15840

0 1/4 1/2 3/4 1

1000 2000 3000 4000 5000

(Joins sheet 72)

(Joins sheet 79)

(Joins sheet 83)

COUNTY

PICKENS

Amicalola Church

West Side School

CREEK

AMICALOLA

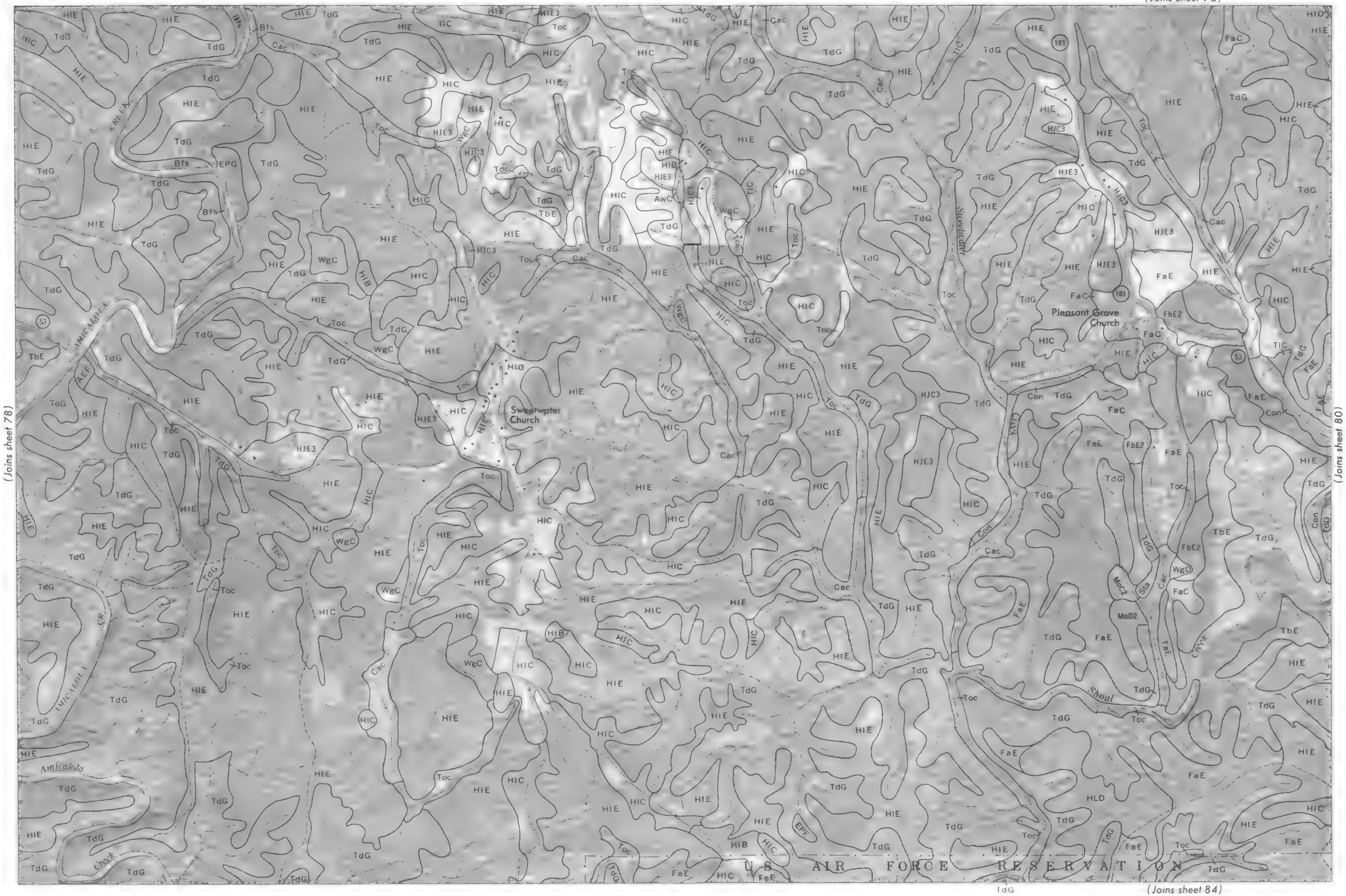
HIE HIC HJE3 TdG WgC WgD RbD3 HLD Cac Toc FbE2 FaC TbE FaE TID HJC3 HIB MCE MuE2 HLC TIC RaE HKC3 Sta AwB WgC

(Joins sheet 73)

(Joins sheet 78)

(Joins sheet 80)

(Joins sheet 84)



N

1 Mile

5 000 Feet

Scale 1:15840

N

Scale 1:15840

5000 Feet

(Joins sheet 74)

(Joins sheet 79)

(Joins sheet 81)

(Joins sheet 85)

DAWSONVILLE

US AIR FORCE RESERVATION

(81)

N

(Joins sheet 75)

(Joins sheet 80)

(Joins sheet 82)

(Joins sheet 86)

Scale 1:15840

1 Mile

5000 Feet

0 0 1000 2000 3000 4000 5000

(Joins sheet 76)

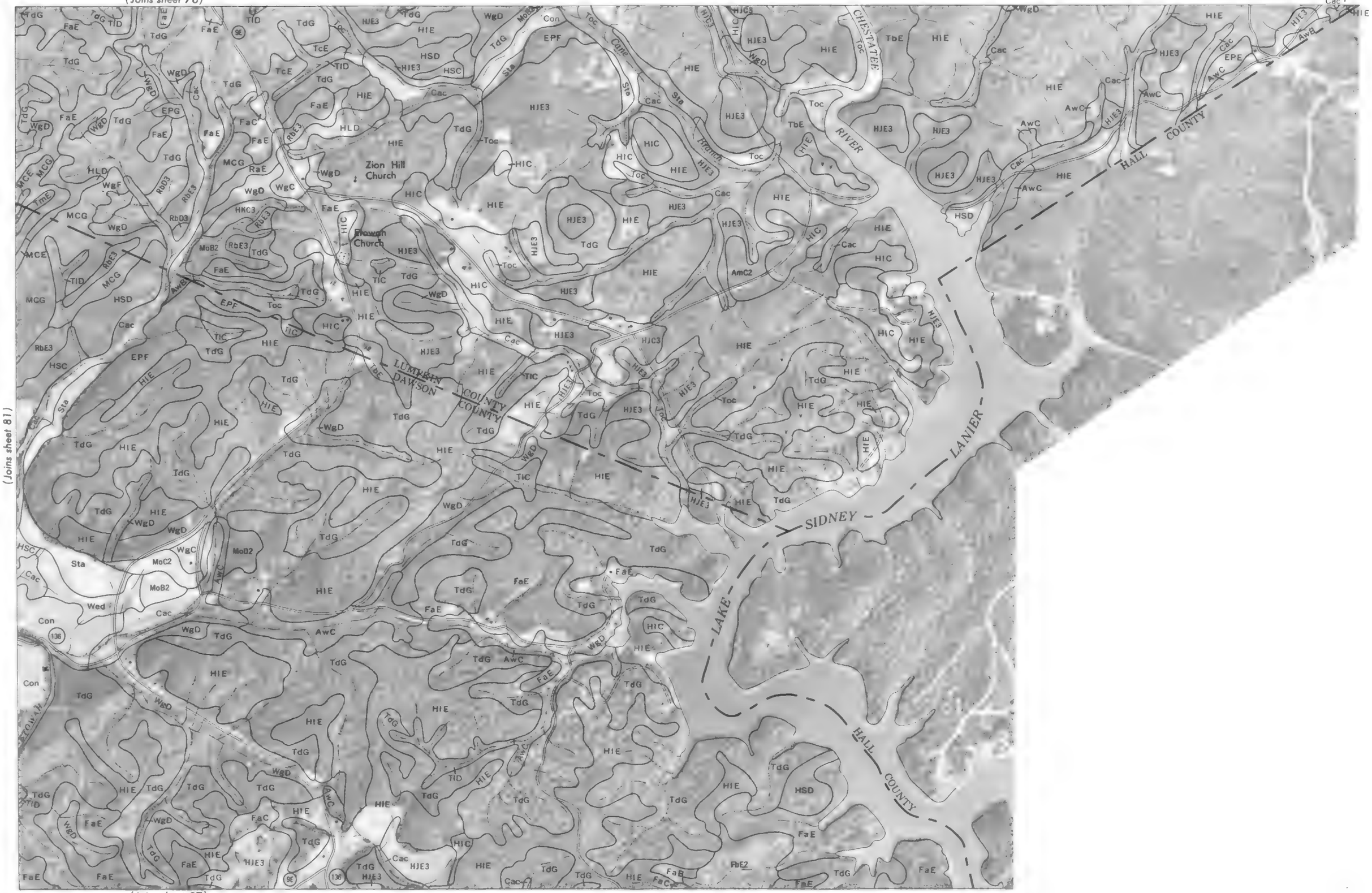
N

1 Mile

5000 Feet

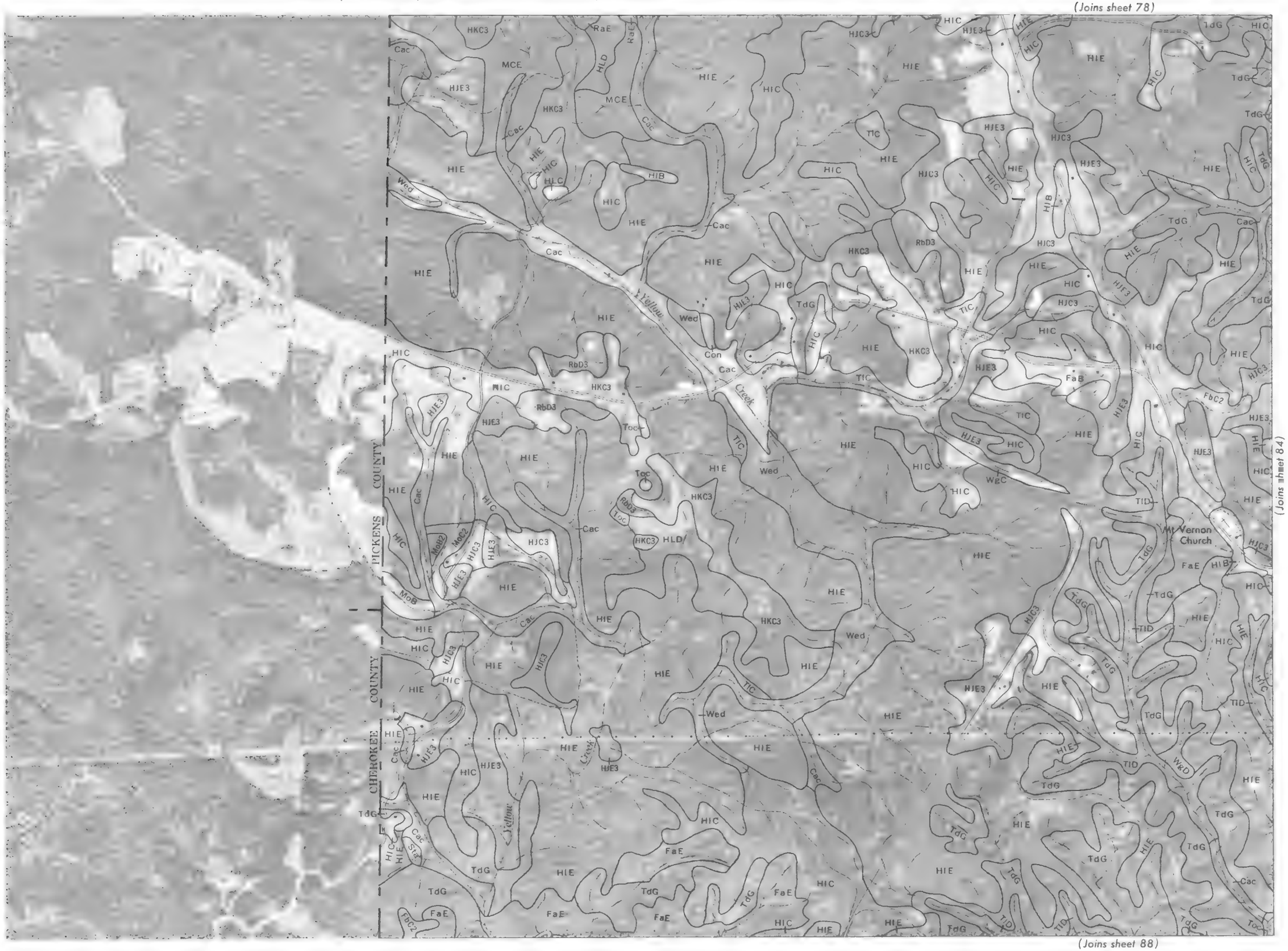
Scale 1:15840

(Joins sheet 81)



(Joins sheet 87)

(Joins sheet 78)



(Joins sheet 84)

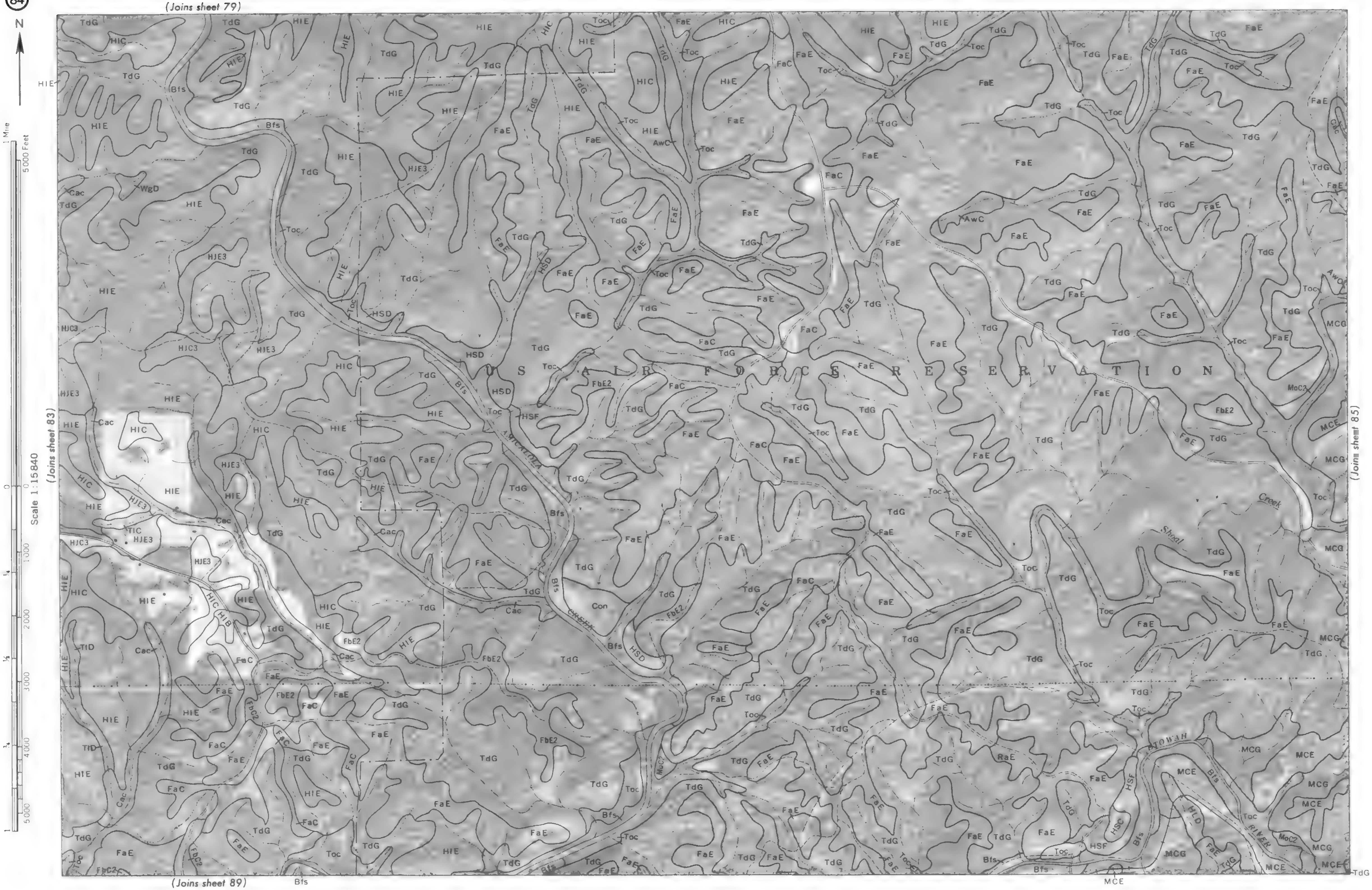
(Joins sheet 88)

N

Scale 1:15840

1 Mile

5000 Feet


(Joins sheet 79)
(Joins sheet 83)
(Joins sheet 85)
(Joins sheet 89)
N
1 Mile
5000 Feet
Scale 1:15840
U S AIR FORCE RESERVATION
AMICALOLA
CREEK
Shoal
Creek
ETOWAH
RIVER

DAWSON, LUMPKIN, AND WHITE COUNTIES, GEORGIA — SHEET NUMBER 85

85

N

(Joins sheet 80)

(Joins sheet 84)

(Joins sheet 86)

(Joins sheet 90)

U S AIR FORCE RESERVATION

1 Mile

5000 Feet

Scale 1:15840

N

1 Mile

5000 Feet

Scale 1:15840

(Joins sheet 85)

(Joins sheet 87)

(Joins sheet 91)

Dougherty

Palmer Creek

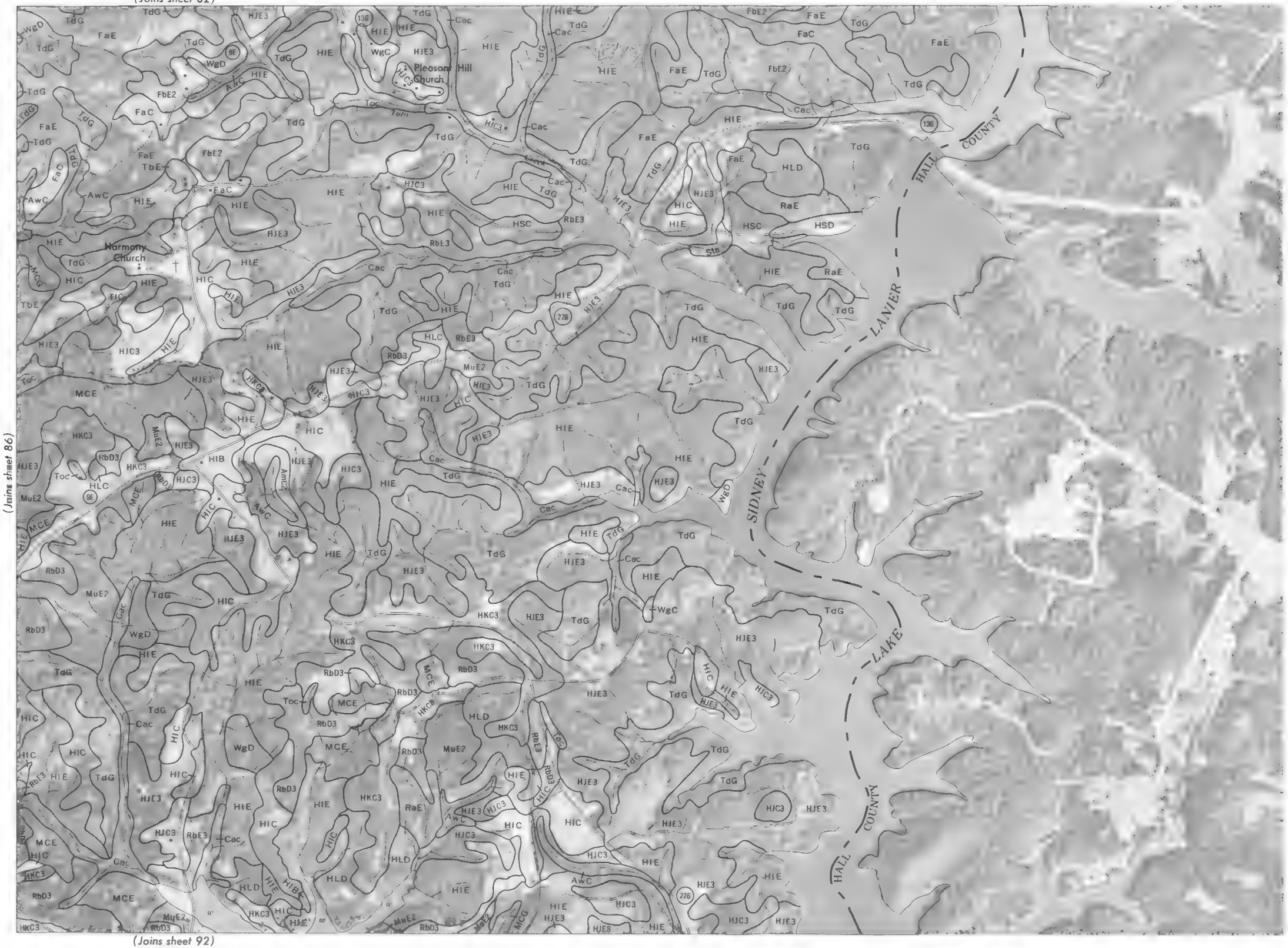
Russell Creek

Provident Creek

Toc Creek

BTOWAH RIVER

(Joins sheet 82)



(Joins sheet 86)

(Joins sheet 92)

87

N

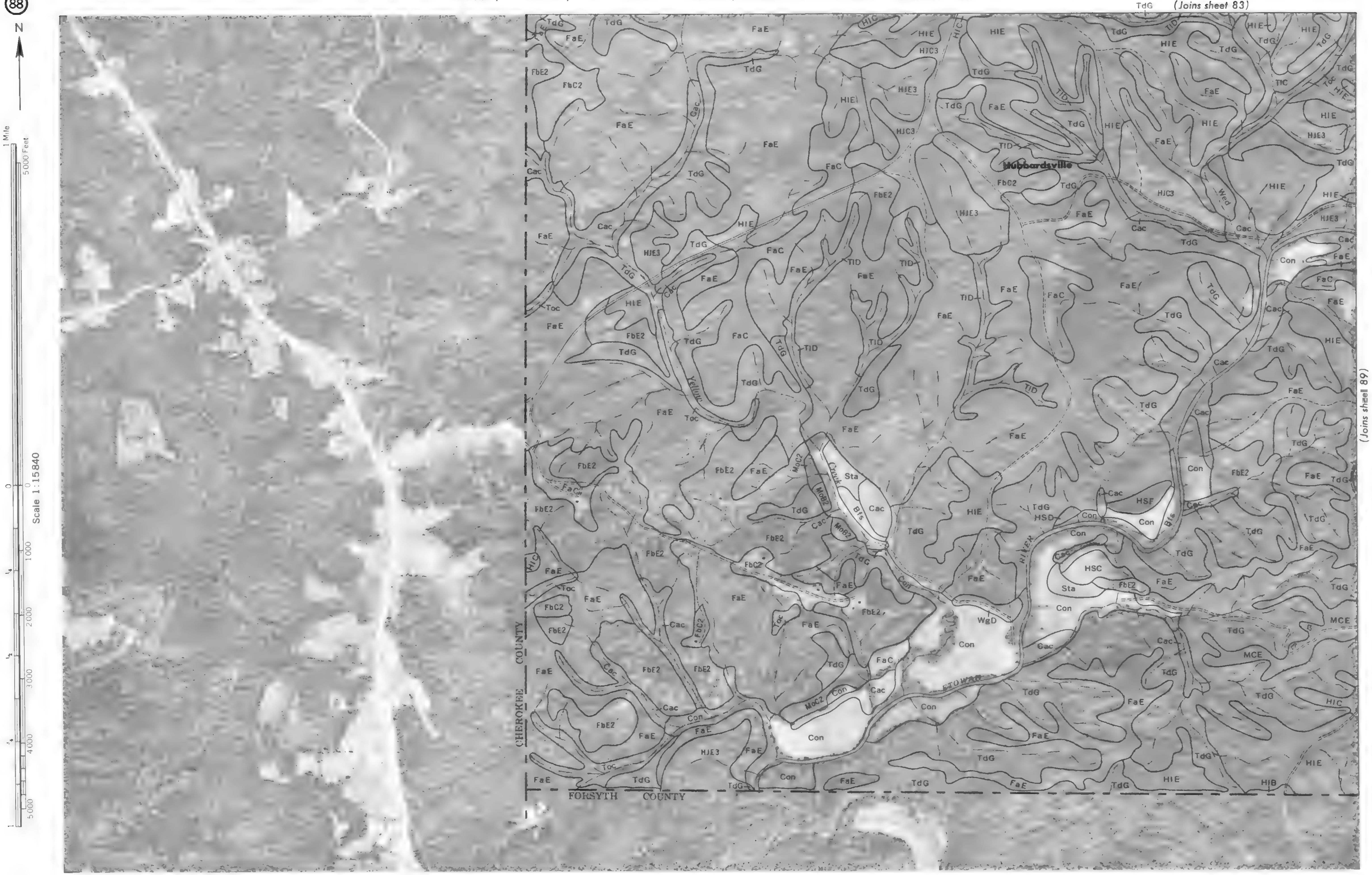
1 Mile

5000 Feet

Scale 1:15840

0 ¼ ½ ¾ 1

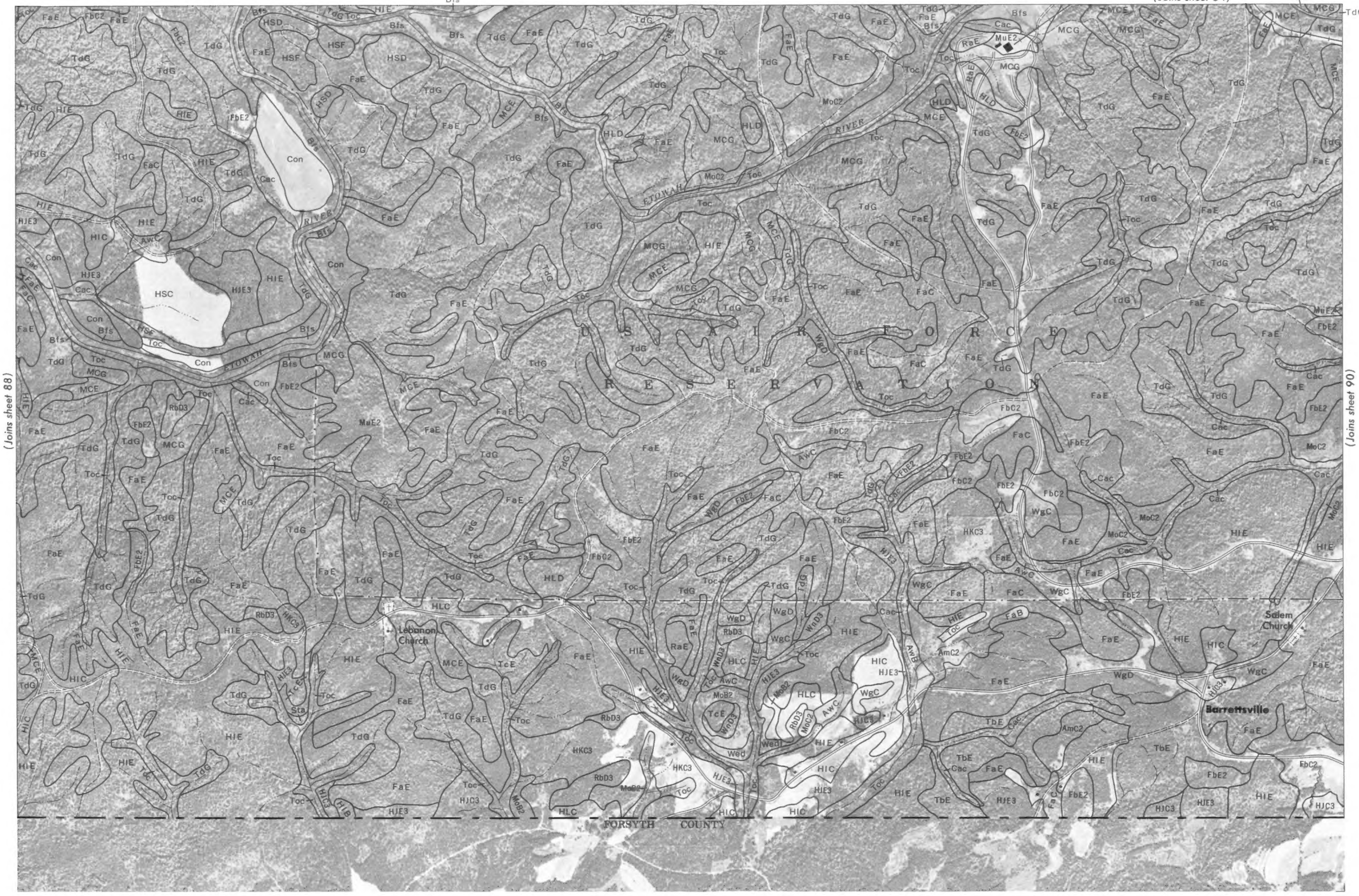
1000 2000 3000 4000 5000


88
N
(Joins sheet 83)
(Joins sheet 89)
Hubbardsville
CHEROKEE COUNTY
FORSYTH COUNTY
ETOWAH RIVER
Yellow Creek
Scale 1:15840
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000

(Joins sheet 84)

(Joins sheet 88)

(Joins sheet 90)

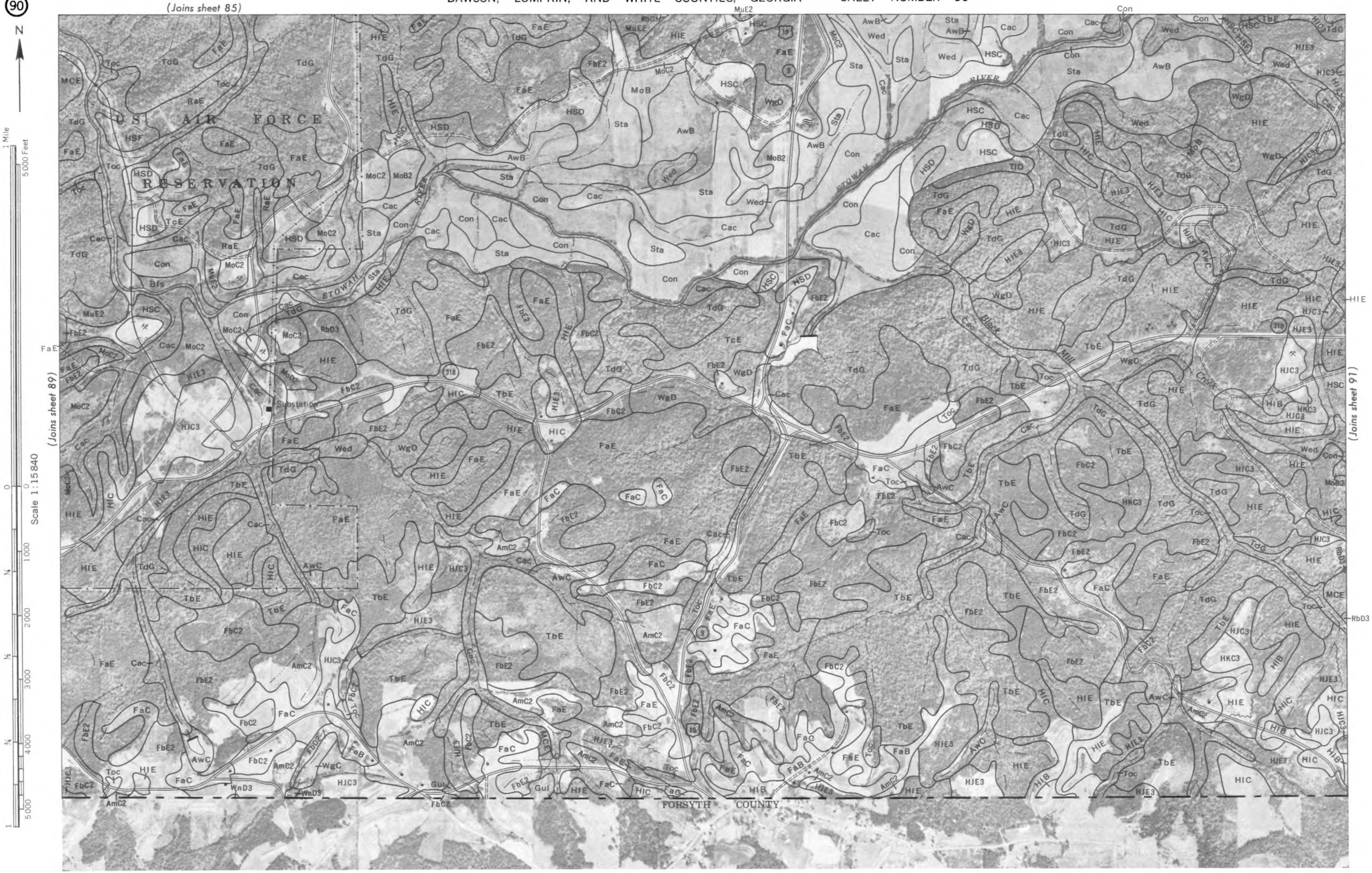


N

1 Mile

5000 Feet

Scale 1:15840


(Joins sheet 85)
(Joins sheet 89)
(Joins sheet 91)
N
1 Mile
5000 Feet
Scale 1:15 840
0
1000
2000
3000
4000
5000
¼
½
¾
1
U S AIR FORCE RESERVATION
ETOWAH RIVER
Black Mill Creek
Substation
FORSYTH COUNTY
318
19
9

(Joins sheet 86)

(Joins sheet 90)

(Joins sheet 92)

FORSYTH COUNTY

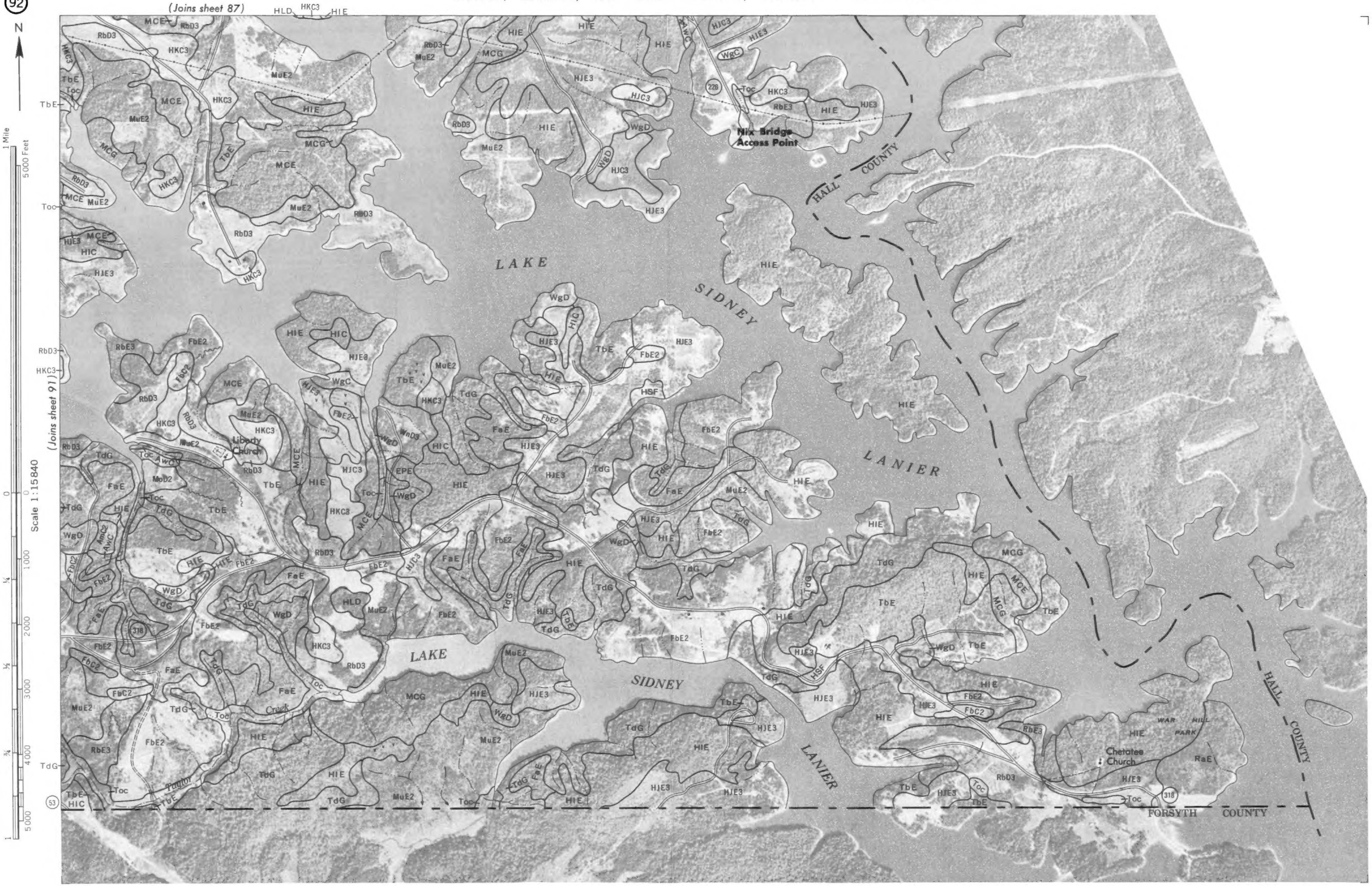
91

N

1 Mile

5000 Feet

Scale 1:15840


92
(Joins sheet 87)
(Joins sheet 91)
N
Scale 1:15840
1 Mile
5000 Feet
LAKE SIDNEY LANIER
LAKE SIDNEY LANIER
HALL COUNTY
HALL COUNTY
FORSYTH COUNTY
Nix Bridge Access Point
Liberty Church
Chestatee Church
WAR HILL PARK
Taylor Creek